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A. I. ROOT, MEDINA, OHIO.

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OUR OWN APIARY.

OR, RATHER, THE TEMPERATURE OF MOTHER EARTH; SUB-EARTH VENTILATION.

MR. G. M. DOOLITTLE touches upon a point that is of considerable interest to me; namely, the temperature of Mother Earth. He calls in question whether 55°, as deduced from Mammoth Cave, is true of all other localities (see page 856). I accordingly consulted a number of philosophies, physical geographies, cyclopædias, and other works that might bear upon the subject. None of these touched upon the particular point in question, and I then came to the conclusion that the temperature of Mother Earth is a relative term which is not uniform in all localities. However, I found that the temperature of artesian wells, to a depth of 2000 feet, is nearly uniform, with one or two exceptions. This temperature at this depth is about 80°; and one artesian well, in Paris, I think, is used for heating purposes.

After searching in vain in the various works treating on the subject, for the temperature of the earth within a few feet of the surface, I determined to institute a series of experiments myself, and, if nothing more, ascertain the temperature of the earth in Medina. Under our bee-hive factory is a well. The lifting-pump to said well will force a stream of water higher than the factory, and, of course, it would take but a second or two for the water to come from the bottom of the well to the surface of the ground. In consequence, the temperature of the water would be of about the same temperature as the ground at a depth of 97 feet. After the pump had been running about two hours, the piping and the pump itself would become of the same temperature as the water. When the pump had been thus running we turned a jet of the water, right from the bottom of the well, into a pail. Into this I plunged a good thermometer. On remaining there a few minutes the mercury showed 56°. To be more sure, another thermometer of different make was tried, with the same result.

There is another well in the factory, used for drinking purposes, whose depth is 30 feet. After pumping perhaps half a barrel of water from this I tested the water as before, with two thermometers, and the result showed 57°. I would say, that this well is entirely inside the factory, and covered with flagging-stone, so that the temperature outside can not affect it. Thus it will be observed, that the temperature of Mother Earth under our factory very nearly tallies with that of Mammoth Cave, which is 55°.

I next tested the water of our cistern at home. After pumping out considerable water as before, and testing, the mercury showed 49°. The cistern is pretty closely covered, but I presume enough frost went down through the open chain-pump to sink the temperature five or six degrees.

In Cleveland last year, during the severe winter, the water-pipes, in some cases to the depth of 4 or 5 ft., froze solid. This being the case, I should suppose that, under ordinary winter weather, the sub-earth ventilator, being placed to a depth of 3 or 4 feet, would not give a temperature much above the freezing-point; and in order to get any thing like 45 degrees of heat we should want our ventilators placed at a depth of 8 feet, as some have recommended. To get 55 degrees of heat we must go to a depth of at least 40 feet, and probably more. This might not be true of all places, but I feel quite sure it would be of Medina.

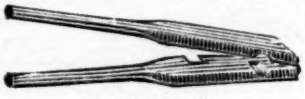
I have shown that the temperature of Mother

Earth at Medina is very nearly that of Mammoth Cave; but in order to get at the temperature here, we must go down 40 feet or more. The well Mr. Doolittle mentions must be very cold — only 11° above the freezing-point in summer. Is this true of other wells in the same locality?

Now, I should like to know how nearly uniform the temperature is in other places, at a depth of 50, 75, or 100 feet. If we are to advise sub-earth ventilators for bee-keepers and others, it is important to know whether this advice is to be taken generally, or applied only to particular localities.

BOTTLING UP HONEY FOR MARKET.

Perhaps some of the friends are aware that we are bottling some of that carload of California honey in the 5-oz. Muth jars. These jars are to be sold to Butler Bros., of New York, as a neat ten-cent article of honey for their counter trade. A day or so ago I noticed one of our men, while putting up this honey, using an implement like the one figured below. The corks to the jars were too large for the mouths of the bottles, and, in consequence, they had to be compressed by some means until they fitted. The implement as shown in the cut will explain itself. You observe that we grasp the handles with the right hand, much in the way we do a nut-cracker. Next, with the cork in the left hand place it in the hole as shown; then while twirling the cork around so as to have it uniform, press upon the



CORK-PRESSER.

handles with the right hand. You notice that there is nothing particularly new in this device; in fact, it is the same thing that druggists use, only this is a home-made implement that any one can make. It is constructed as follows:

Procure a piece of wood (hard wood preferred), 2× 3 by about 18 inches long. Near one end bore an inch hole half through. On the other side bore a similar 1½-inch hole, suited for larger corks. Next rip the piece through the middle of the strip with a rip hand-saw, in such a way as to cut the holes in halves. Fasten the ends near the holes with a common door-hinge; the other ends, whittle off for the handles. The implement is now complete, and operates like a nut-cracker. The cut shows the position of the holes after the piece is ripped. You can now fit corks to your honey-jars as well as the druggist, and the whole expense is but a trifle.

ERNEST R. ROOT.

REVERSING DEVICES.

SHALL WE USE REVERSIBLE HIVES OR REVERSIBLE FRAMES.

IN your reply to the article entitled, "Reversing the Hives instead of the Frames," page 771, Nov. GLEANINGS, you suggest that we "go a little further and have frames made without any projections at all to the top-bars, in order that the frames may be lifted out when the hive is turned over." Now, if this were done, or even could be done without the grave difficulties alluded to, where would reversing the hive come in? However, we confess that we have lost some sleep trying to get rid of a small piece of the top-bar of said frames, that seemed to stick out very prominently at times, and be in the way, while at so many other times they were "such a handy thing to have about," as Toodles remarked about a second-hand coffin he had purchased. Still, notwithstanding all this, we have never been able to get along, as yet, without the nice little projection at the ends of the frames, and they must be at the top at that. If you are very anxious to have a frame such as you mention, you will have to get after friend Benton again (see page 552, Aug. 15, 1885). May be he can help you out of the difficulty.

We have figured it out in our own minds, that his reversible frame is certainly long enough to just fit inside of the hive, and slide down flush with the end, resting upon strips attached to the bottom of the hive in such a manner as to support the frames and preserve the proper distance from the bottom-board. Whether this is the way it is done, or, if so, whether it is practical or not, remains to be seen. Nevertheless, one thing remains certain; viz.: the necessity and utility of reversing frames at the proper time, and for certain purposes, seems now to be generally conceded. The bee-keeping friends are ready for it, and the great question to determine is, not whether we shall reverse our frames or not, but, how shall it be done, at the least trouble, by the quickest method, and at the least expense? Shall it be done by reversing the frames alone and singly, or by reversing the hives, and by this means turning all the frames at one operation? Now, since this matter of reversing the hives, being still in its infancy, has not been as fully brought out as reversible frames, nor perhaps as well understood, and because you, friend R., started the ball to rolling when you told us about reversing the Simplicity, let us fully investigate its claims, pro and con; and if there is nothing in it, of course it will turn out differently from "Banquo's ghost."

Now, in order to bring out the matter in the clearest light, let us suppose a case in practice. If reversible frames should be decided upon, by some one owning an apiary of 50 to 100 colonies in ten-frame hives, and the bees all were comfortably installed on movable frames having the regular orthodox projecting top-bars, in order to convert them into reversible ones, the necessity would arise of purchasing or manufacturing 1000 to 2000 reversing devices; the removal of 500 to 1000 frames of comb from the bees, a few at a time, to a place suited to work at them; the sawing or cutting off of 1000 to 2000 projections, together with the fitting and attaching of the same number of said devices, and then returning them to their proper places! Now, the question is, Would this be a very easy and practical undertaking at any other time than early spring, or even then would it pay for the expense and trouble? Who has done it? On the other hand, suppose he should adopt reversible hives instead of reversible frames, to accomplish said purpose. How proceed? We answer, first have ready a few reversible hives to commence the work with. This can be done by fixing over hives that are on hand and empty, making them reversible; or if none are on hand, making all the new ones on the new plan that are going to be needed, then proceed to set a colony in each one, then fix over those thus emptied, and so on, until all are completed.

Now for the questions. How easy is this plan? how practical? how expensive? how much better than the other method? We will presume to answer as follows: Very much easier; much more practi-

cal; a great deal less expensive; and, in our opinion, as good, if not better, save in the one instance of not allowing the frames to be removed while the hive is turned over until it is turned back again. We do not presume to know how much of an objection this would be to the average bee-keeper, or whether any, but are inclined to think that it would all depend upon how often occur the necessity and occasion for removal at the particular time the hive is thus reversed. It is not presumed that the hive shall be turned up very long at a time, if we thoroughly understand for what purpose and when it should be done.

Now as to the question, Can our hives that we now have in use be easily altered to be reversible ones? We think that the most of the kinds in use can be, and at very little trouble and expense. We remodled about 80 this spring. HEMPHILL & GOODMAN.

Elsbury, Mo.

A PLEASANT REMINISCENCE OF CHILDHOOD DAYS.

A SAMPLE OF A BOX-HIVE MAN.

FRIEND ROOT:—Our first business transaction dates Jan. 11th, 1883. In connection with business as one of your Western customers, you will probably know the name. As I have as yet obtained no great distinction among men as an apiarist, or any other vocation, you may consider my scribbling of little consequence, and lay it aside, or consign it to the waste-basket. Be this as it may, I will proceed to give an account of myself, and the progress made in our "chosen pursuit" throughout my locality.

My father was a bee-man before me, hence you can throw the mantle of charity over me, if I appear too enthusiastic. He emanated from Kentucky soil, and pitched his tent in the exact locality of the writer, in the spring of 1828. Civilization was then battling with the red man and wild beasts of the forest. Settlements were very sparse, and those twenty miles distant were considered neighbors.

Within a dozen rods of our present residence is the site of the old log cabin. Two little mounds are all that remain to mark the location. The two mud-and-stick chimneys that have long since fallen to decay leave the only monuments to the memory of the pioneer days of our parents. How my memory reverts to the many incidents related by my parents, while they were occupants of this rude domicile, of how the wolves howled, panthers screamed, night-owls screeched, and many unaccountable noises made nights hideous! how they had to make tight coverings over their pigs, to prevent "varmints" from carrying them off; how, within an hour or two hunt, they could secure the best of venison and wild turkey; and frequently within a stone's throw of the cabin; how they lived for months on venison, hominy, and wild honey, with an occasional abridgement of johnny cake and sassafras tea.

It was in those days that we might date the dawn of bee culture on the Hambaugh homestead. Captured in the wilds of the forest, and with the proverbial "log gum" prepared, the increase soon brought its reward, and a primitive apiary was the result. Under the supervision of my father the bees were a source of considerable revenue. Being a man of strong constitution and indomitable energy, the surrounding forests gradually gave way to fields of waving grain. The old log cabin was eventually superseded by a large residence; and ere his death the "iron horse" was traveling through his possessions, and the landscape was transformed into a beautiful panorama. The onward progress of civilization had worked wonders, and none were so well calculated to realize it as those who had endured the drawbacks and privations of early pioneers.

Never has the old homestead been entirely destitute of the busy bee. The "hum" used to gladden the heart of my father; and though the modes of management were those of the primitive days, he took great pride in them, and many a barrel and keg of strained and "mush" honey has he sent to market. Within my own recollection I have seen old-fashioned "log gums," that would require three or four men to handle, carried from the brimstone-pit to the old house, where its contents were disposed of. The harvest, which took place the first cold weather in winter, usually lasted a week or ten days, and the wax was by no means a small factor in the enterprise. An old resident in our neighborhood states that he paid for eighty acres of land with money obtained from beeswax alone.

It was always a source of pleasure for me to assist my father with his bees; and as he grew old, the care of them gradually fell to me; as the bees were considered a matter of minor importance, no special pains were taken, other than to have plenty of "gums" in readiness for the swarms, and when they issued, hive them, place them in a fence-corner, and let them go till the harvest came around, then what the moth-miller had not destroyed we would confiscate, except sufficient for the next year's increase.

It was about four years ago that I took my first step forward in the art of bee culture, and I must confess it was a very short one. I took no broader view of the art than to follow those of my own knowledge who were the pronounced bee-men. An elderly gentleman of our county, by the name of Walsh, was the pronounced bee-oracle, and I partook freely of his instructions, which were something of this order: "You are bound to give the bees room for their surplus fat, the natural accumulations from the under part of the abdomen"—a terrible dagger to comb foundation. He says the extractor is a humbug, and has done more to degrade the honey market than any other one thing, and ought to be abolished. He is also adverse to the use of sections for surplus honey. He also states the Italian bee is far inferior to our native blacks, and are fit for nothing but to rob, pillage, and sting. He says father Langstroth is a humbug; that the movable-frame hive was in use a century before him. He laughs at the idea of building up weak colonies with brood from the strong, to avoid moth. He has been puzzling his brains for years over an effectual moth-trap, which he claims to have perfected, and a queer device, too complicated to describe, can be seen under every one of his hives. He says that nectar does not emanate from flowers, but from the elements, and falls like dew; and, were there no flowers, bees would gather honey from church-steeples and house-tops. I could relate many other cranky notions of this respected gentleman, but this will suffice to show how far some can wander who will not

accept of any standard works or bee-masters as superior to their own frail and crooked ideas.

This man was my tutor for one year, and I was foolish enough to use a few of his hives, and, of course, you can believe my first step a short one in advanced bee culture; and up to this time I had never seen the inside of a bee-book. I had often heard of Langstroth's work, and was anxious to learn something of the hidden mysteries of the bee-hive. I chanced to receive a sample copy of the *Farm Journal*, in which I found an advertisement from A. I. Root, asking all who were interested in bees to send him their names. I complied, and received your catalogue in return, and it was but a short time ere the A B C was at hand. With this able work I felt a new impetus, and, with the addition of Cook's Manual and Dzierzon's work, I flattered myself as making broad strides in the right direction. The old hive was soon superseded by the eight-frame Langstroth hive, and, still later, all have been transferred to ten-frame Simplicity hives, where they are going to stay.

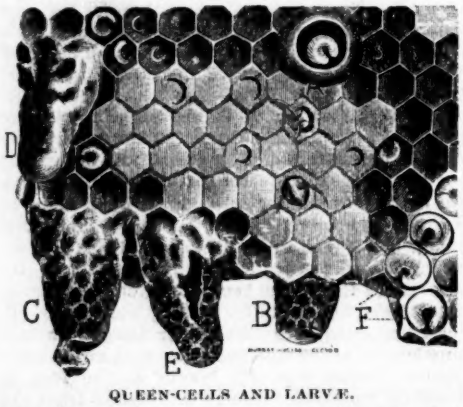
In connection with what I have gained from our leading bee-periodicals and standard works on bee culture, I have visited several apiarists of note, chief among which are the old pioneers in the profession, Chas. Dadant & Son, to whom I am indebted for willing and wise counsel. Long may they live! I have prolonged my remarks further than intended, and I fear trespassing on your valuable space.

Springs, Ill., Nov. 25, 1885. J. M. HAMBAUGH.

QUEEN-CELLS.

LARVÆ, AND THEIR DEVELOPMENT.

FOR some time we have been trying to get a good cut of queen-cells and brood for our A B C book; and after several trials our engravers have at last succeeded. The veterans will recognize the different cells as shown below.



QUEEN-CELLS AND LARVÆ.

D, whose surface is smooth, and does not show the usual network, contains only a drone-larva, instead of a young queen. A is a queen-cell just started; B is a cell further on in its stage of development. C is a cell from which a queen is just hatched, and to which the little hinged cap still adheres. E shows a cell that has been torn open by a young queen. This opening shows evidence that the bees had assisted her after she had made a small hole. In this connection I would say, that when tearing down unnecessary cells I rarely take the trouble to destroy them wholly, and hence I merely pierce a small hole with the knife or a straw, and leave the bees to do the rest. F shows the grubs, or larvæ, and which are seen scattered in various places. Below A is sealed brood, and here and there young bees just gnawing out. These young bees are not so good as the rest of the engraving.

While upon this subject I shall give a brief review of the development of the larvæ, as set forth in the admirable work of Frank Cheshire. Huber, Réaumur, and others, claim that the grub does not change its skin in the process of development. Cheshire claims that this assertion is a mistake; that the skin is non-elastic, and that in a short time, becoming bad fitting, it bursts, and is cast off. In like manner this is replaced by a new skin, and so on to the probable number of five.

This was a new idea to me. On consulting the authorities on the silkworm I found that it also casts off a number of skins. As the silkworm is the larva of the moth, if we reason from analogy we are led to suppose that the larva of the bee may cast off its skin also. Frank Cheshire states that a careful investigation will show the ruptured pellicles in the bottom of the cells; however, with my Coddington lens, Boush & Lomb instrument, and dissecting-tools, I failed to discover more than one pellicle. Perhaps I am not skilful enough; but because I do not succeed in finding them I am not prepared to say they are not there. Briefly, then, the development of the larvæ as given by him, is this:

The grub, after casting off its several skins, packs them in the bottom of the cell, together with the excrement given off by the grub. The last pellicle it packs around the cell, and then completes the inclosure with its silken web. This leaves the cell nice and clean, and the grub has now only to grow. Microscopical examination shows that this case, cocoon, or whatever we may call it, is not a mass of fibers, as we might expect, if it were simply the web of the larva. On the contrary, it has the appearance of a skin, or pellicle, of the worm. Had it not been winter weather after procuring a larva from the hive, I would have skinned him and compared this with the lining of the cell. If the microscope showed they were identical in appearance, I should be compelled to believe that Mr. Cheshire is correct.

When the weather permits I will push this matter a little further. If good authorities have been mistaken for so long, it is time we put ourselves to rights. ERNEST R. ROOT.

WINTERING IN THE SOUTH NOT SO EASY.

LEAVES FOR PACKING.

FRIEND ROOT:—Though this is a rather late day to send in my report for last winter, I should like some of the veterans who have lost so heavily to know how a novice has succeeded in the all-important subject of wintering. Fall count, 18—17 strong, 1 weak (a cluster covering only 4 frames). The 17 colonies had from 30 to 50 lbs. of honey each, just such as they had gathered from the field. The weak one was fed up on unfinished sections, after frost had fallen. Spring count showed that I had not lost a colony, although one-half of them were weak, caused from

dysentery. Eight of my colonies had a quilt, made of a common corn-sack that cost only 6¼ cts. each, over the frames, and without an exception they came through clean and dry, not a sign of dysentery; even the colony with only four frames came out all right. The remaining ten colonies had a honey-board on; and, with two exceptions, they had dysentery badly. The upper story of each hive was packed with forest-leaves, as suggested by J. E. Pond, Jr.

Many may think that it is a very simple matter to winter bees as far south as this; but when I tell you that from one-third to three-fourths of each apiary was lost the past winter in this county, you will not think it such a simple thing to winter successfully. The tropics are away south of here, for we had plenty of zero weather last winter. From 6 to 14 degrees below was not unusual. Pollen was abundant in every hive; but I am of the opinion that it would have been better had there not been so much of it present. My bees were left on summer stands, with a wind-break of cornstalks about 6 feet high to protect them from the north winds.

Now, friend Root, I should like to have you tell me when is the best time to move bees; also how to prepare them for shipment. Don't you think in March or April would be the best time? I shall move from here to Bowling Green, Ky. You remember the place, of course, as you passed through it on your way to the World's Exposition. Your description of the cave was very interesting, and, strange as it may seem to you, although I have lived within 30 miles of the great wonder all my life nearly, I was never in it. We are apt to care very little for wonders near us. E. W. STAYTON.

Martin, Tenn.

Thanks, friend S., for your kind letter. The subject of moving bees is so fully discussed in the A B C book that it would hardly be advisable to go over it here. I think March or April would probably be the best time. We should try to avoid either extreme — very hot or very cold.

REPORTS ENCOURAGING.

FROM 25 TO 50, AND ABOUT 13,000 LBS. OF HONEY.

MARCH 1, 1885, found me with 25 colonies of bees — two-thirds Italians, one-third black. I increased by natural swarming to 50. By May 1st I stopped all swarming by extracting and cutting queen-cells after above date. I finished extracting to-day, November 10th. I had 1060 gallons of honey, all extracted from top story, the bees having their winter supply since June, in lower story of 10 frames, from basswood. I bought a new belt, and shall wear it until somebody does better. Let him report, and I will send said belt by first mail. JOHN W. ROSS.

Velasco, Brazoria Co., Tex., Nov. 10, 1885.

Why, friend R., your report is a tremendous one. Estimating 11 lbs. of honey to the gallon, we find you received about 260 lbs. on an average from each of your original 25. Good for Texas!

BEES PAY LIKE OTHER STOCK.

My report for this year is not large, yet every year convinces me that bees can be made to pay as well as any other stock on the farm; and as to the sale of the honey, when put up in good shape, it will sell about as well as butter. Spring count, 17; increased to 25; good condition; comb honey, 600 lbs.; extracted honey, 600 lbs.; all, 1200 lbs. Sold 700 lbs., nearly all at home. O. S. DUGBY.

Kingsville, Ashtabula Co., Ohio.

FROM 14 TO 26, AND SOLD $90.00 WORTH OF BEES AND HONEY.

Last spring I lost my entire apiary of 66 colonies, fall count, except one queen and about a teacupful of bees, which, by careful nursing, I built up to a good strong colony during the season. I sent to friend Foster for 14 nuclei, which I built up to good colonies, and increased during the season to 26 good strong stocks. We got no surplus here till about the last week in August, then we had a nice little honey-flow of some three weeks. The result of my summer's work foots up thus: 14 nuclei increased to 26, all in good condition for winter; sold $50.00 worth of bees, and have $40.00 worth of fine thick honey. While this is nothing to boast of, still I am satisfied, all things taken into consideration.

J. W. MARGRAVE.

Hiawatha, Kansas, Dec. 4, 1885.

"IF AT FIRST YOU DON'T SUCCEED, TRY AGAIN."

I have been a reader of your paper for several years. Though I have been in the bee business only two years, I will give you my report for the past season, but it will hardly be fair to give it and say nothing of last year's work.

I came here from Ohio in April, 1884; bought 50 colonies at $5.00 per colony; increased to 65, and took 800 lbs. of honey; purchased 14 more in the fall, at $3.00 per colony, making 79 in all. A great part of their stores was honey-dew. About all survived the winter; but spring dwindling set in, and left only 47, 4 of them queenless, and most of the others weak; but by feeding and extra care, I got them into fair condition. By the commencement of the white-clover flow they increased to 84, and took 3700 lbs. honey—1400 extracted, 2300 comb. I have sold, up to the present time, $420 worth, and have on hand $60.00 worth. I have tried Heddon's plan for preventing second swarms, and I succeeded very well. I have also used his crates, but prefer a modification, and a plain honey-board, making the bee-space in the bottom of the crate instead of in the honey-board.

Beginners can save money by making chaff cushions out of burlap, such as yarn, cotton batting, etc., are shipped in. I get it of the dry-goods merchants, and the material for my cushions costs less than a cent each.

I find gloves acceptable occasionally, in the fall, while handling cross hybrids, and have a pair made of firm brown ducking, with openings for my fingers to extend through, nearly to the second joint. The bees will not sting it as they do buckskin. Our sources of honey here are the old reliable white clover; and for fall supply, the Spanish needle, which grows abundantly here in the bottoms, sloughs, and low ground, and yields a rich yellow honey, resembling poplar honey in appearance and flavor.

Bees are plentiful here, and I have been surprised at the amount of honey brought in here for sale from old box hives, which speaks well for the country as a honey section. B. A. RAPP.

Chillicothe, Mo., Dec. 6, 1885.

AN AVERAGE OF 75 LBS. OF HONEY PER COLONY.

I commenced the winter of 1884 with 30 swarms; 2 starved—the first I have lost in wintering for five years. I commenced this season with 28; have taken about 1600 lbs. in sections, 500 lbs. with extractor—an average of 75 lbs. I have now 41 swarms, after doubling back. Best yield, about 175 lbs. in sections, 25 extracted; lightest, 50 lbs. in sections. I winter one-half in chaff hives on summer stands, the rest in cellar. C. H. BOYD.

North Monroe, Waldo Co., Me., Dec. 7, 1885.

REPORTS DISCOURAGING.

100 HIVES, AND NOT ENOUGH TO WINTER ON.

I HAVE 104 hives of bees; had about 100 in the spring. They haven't gathered enough to winter on. I have fed them about 500 lbs., and will have to feed about 200 more in the spring, so you see that it is all loss this season. The hard cold winter in the spring, and the dry weather, killed the clover; buckwheat was not very good.

Amity, N. Y., Dec. 4, 1885. J. W. UTTER.

DISCOURAGING TO A NEW BEGINNER.

My expectations in the bee-business have utterly failed. I shall not get over 10 or 15 lbs. of box honey, from 16 hives. What do you suppose is the reason they did not make any more honey? I had buckwheat, and a great variety of flowers, besides quite a lot of the spider plant all around our place, besides being right alongside the woods. My honey so far has cost me about $5.00 per lb. Of course, the brood-chamber has all they will need for winter and brood-rearing; but from the account of so many bee-men, about bees filling the hive and turning off such quantities of honey in one season, it looks (after my first season's experience) rather dubious.

I got, in the spring, 6 box hives, and increased to 17 (one dwindled or died), and I now have 16 hives of bees, and took honey from only two of them, and I am out about $60.00 on the bee-business. This does not look very flattering, does it? Still, I expect to increase them until I get 100 colonies or more, if I can possibly raise the money to buy the Simplicity hives, for I don't like any other. R. J. WATERS.

New Madrid, Mo., Nov. 2, 1885.

FALSE STATEMENTS IN REGARD TO THE HONEY BUSINESS OF OUR COUNTRY.

As a protection to our bee-keeping population, we propose in this department to publish the names of newspapers that persist in publishing false statements in regard to the purity of honey which we as bee-keepers put on the market.

THE following I copied from the editorial department of the New York Weekly *Witness*, issue of Sept. 3, 1885, page 6:

"Honey has become so adulterated now that there is no pleasure to the fastidious in eating it, as you do not know whether you are eating a mixture of glucose and honey, or the pure unadulterated article. Virgin honey in the comb, as manufactured by the bees, is most delicious; but nowadays the bees are saved the trouble of making the comb, and a manufactured article is put in for them to fill with honey, and you do not know in eating it whether you are eating bee-made comb or man-made comb, a tough and indigestible mass. Let us have pure honey, Mr. Bee-keeper!

It is a reply to L. Starr, Mallory, N. Y., an intelligent bee-keeper, if I mistake not. Mr. Starr is probably not a reader of GLEANINGS, or he would, or should, have sent you this item himself, together with his own letter in the *Witness*.

The above, considering the source, and the position as a Christian teacher of the author, may justly be styled "a pious fraud."

JOHN D. GEHRING.

Park College, Mo., Dec. 4, 1885.

Thanks, friend G., for kindly calling our attention to this matter. It does seem to me really awful, to see papers like the *Witness* listening to sensational newspaper canards until they lose their own senses. Now, dear friends of the *Witness*, will you not be kind enough to as publicly correct the false impressions you have given, and admit that you were mistaken? My offer of $1000 is still open, to any newspaper editor, or anybody else, who will tell us where comb honey is manufactured without the agency of bees. I appeal to you as Christian men to make a little reparation for the injury you have done a class of honest and hard-working people. You have GLEANINGS as an exchange; and by reading the numbers for a few months back, especially the articles under the department that heads this, you can see how hard we have been laboring to get even simple justice. No one should buy honey without seeing that the name of the producer is on the package; and if you do this, I am sure you will not get either liquid honey nor comb honey that is a fraud. This quotation from the *Witness* is the one referred to on p. 647, Sept. 15.

The following is clipped from the *American Analyst:*

HONEY.—You are correct about the prevalence of adulterated honey. Comparatively little of the article bearing that name sold in retail stores is genuine, even the wax cells being often skillfully and fraudulently imitated. We noticed in the last number of the London *Analyst* that a correspondent warns analytical chemists against American honeys, which he says are being adulterated with a syrup manufactured with maize, the method being kept secret. His own experience shows, however, that if wheat or maize starch (not potato starch) be treated with oxalic acid or any other powerful organic acid, a syrup is produced, which, in a certain concentration, and after standing two or three weeks, exactly resembles, in taste and appearance, an old honey. It seems a shame to cheat the busy bee out of the reward of his patient industry.

If any journal should be truthful and reliable in matters of this kind, it seems to me that one with such a name as the above paper, hailing from 176 Broadway, New York, ought to be that one. Now, friends of the *American Analyst*, we call upon you to correct your unwise and very positive statement. If anybody in the world ought to be careful what he says, it is an editor; and for an editor of a scientific paper to thus help on a fraud is lamentable. Will you not please add, friends, that it is a mistake, and that you were misinformed? If you think there is such a place, where wax cells are imitated, as you say, just hunt it up, and your $1000 which we offered last month is ready now. Yes, it is now $1500. You will please prove you were right, or else take back what you said.

MORE ABOUT HONESTY AND HONEST WARES.

STRICT BUSINESS PRINCIPLES.

THANK you, friend Root, for the credit you give me, of both kinds, for my last article, Oct. 15. Bless your heart, I should like to give you a great deal more of the same kind, if you can have patience with me. I meant to add, that Mr. Wright said he must make the mistake concerning that honey "right with the old fellow," and I have no doubt he did. I can generally tell by the way a man says such a thing whether he means it or not. Can't you?

Mr. E. went to a shoe-shop to get his boots mended. Mr. D., the cobbler, had not been long settled in M., and he was not acquainted with E., neither did he know Jim S. as well as his neighbors did, until he had lately found him out. E. wanted Mr. D. to mend his boots, and E. would bring him wood in payment. Mr. D. said he would take the wood, but he would have to have it before he did the work. E. was rather taken *down*, for he had never been taken *up* that way before. Mr. D. explained that he had done some work for Jim S. on such an agreement, but the wood had never come, and he could not afford to run another such risk. E. replied, "I do not blame you. But I will give you a load if you will go out and find one man who will not tell you that I will bring you the wood if I promise to."

At this juncture Mr. B. stepped into the shop, and E. stated the case.

"You mend his boots," said Mr. B.; "and if he does not bring you the wood I will pay you for it." Mr. D. mended the boots, and E. hauled him the wood. Who would you or I rather be—E. or Jim S.? Why, bless you, E. possessed what was worth more than any $10,000 that Jim S. might gain—a good name.

It is not every man who would scorn to tell a lie for a thousand dollars—who would feel insulted if offered a bribe—who is clear of little, petty, secret deceits. It is the subtle form in which temptations often come that constitutes their chief danger. Many men who regard themselves as quite honest will cheat in a horse-trade by failing to mention some little blemish, or will, if a man pays him a little too much change, keep it. "He made the mistake; let him learn to be careful." Such things seem to me very dishonest. In no way is one more often tempted than to sell an article slightly inferior, for a good price. To produce a really first-class article at a high price, even at, it may be, some pecuniary loss, is a kind of honesty as worthy as any. Speaking of E. led me to the above thoughts. He has always sold his wood a little higher than any one else around here; yet there are a number who prefer to buy his wood. It is the same kind of timber, but is all of full length, well split; and he gives, as we often term it, "Methodist measure."

E. once made some railroad-ties for a horse-car road. One of the company said, as he examined them, "I have but one objection to them; that is, that the rest are not all as good as these." He did not make as much money as other contractors, perhaps, but he earned what was better. I repeat nearly what I said before: To produce a first-class article—an *honest* article, if you please, is to win a golden name—an honor which is as well earned, and may be as proudly worn, as any the world can offer. It is a prize worth having, if nothing else is involved. I am far from estimating the value of a good name in dollars and cents alone. To be justly esteemed by others is a great boon: to be justly esteemed by myself is a greater one. On the contrary, to be dishonored by others is only better than to be dishonored by myself. All these things are involved in this matter.

I once went into a drug-store to get a glass of soda. While drinking, the druggist stepped into the back part of the store. Hidden from his view by the apparatus I could easily have stepped out; and when at length he came to receive the money I jocosely told him so.

"Oh! well, now, you wouldn't have done that. Why, you would have felt worse about it than I should."

I thought, "You are right, Mr. D.; I *should* have felt worse. And no matter what I might slip out of or slip into, if I should do such things I should know myself to be a slippery man, and others would know it, and I would to that extent lose the respect of myself and all true, honest men. I prefer to be honored and trusted by myself and others, at whatever sacrifice."

I once accidentally overheard a whispered remark concerning myself: "He is as honest as the day is long." I felt, not vain, but proud. If I am honest, I am amply repaid for it. I am a poor man, and discontented with my lot; but I would rather take poverty with honor, than the wealth of Jay Gould with all its attendant blessings, and the name he has acquired with it.

But I do say, that honesty in all things will pay pecuniarily. Rogues sometimes prosper more than any honest man can. But usually the reverse is the case. E. rejected a number of wood-choppers, to employ a man whom he knew would do a good job—a species of honesty. It paid that man to be thus honest. I know that the growing business of Mr. Wright, before mentioned, is very largely due to the fact that he is known to be trustworthy.

The propensity of some men to make false promises, or thoughtless promises, which they make no effort to fulfill, is very annoying. Either one is a kind of dishonesty—the former, a bad type of it. The one who practices such deceit is sure to lose the confidence of his customers; and to do that is to lose both reputation and business. I once wanted a job of nice work done at a planing-mill in S. I gave the order in the forenoon, and the material was promised by three o'clock. I got there a little after time, and, so far as I could tell, my order had not been yet touched. The boss came and told me that they did not have all the lumber necessary to fill the order, and had had to send for it before they could do the work, looking anxiously into the back room as he said it. Did you ever see a boy try to sneak out of a room with something under his coat that he wanted to hide? Well, that man talked just as such a boy would act. I believe that excuse was a pure fabrication. He could hardly see how to excuse himself, it appeared to me.

"How long before the stuff will be ready?" I asked.

"About fifteen minutes."

I went away, and returned in about half an hour, to find a man sawing at some boards that looked like mine; but surely mine were done. I looked at them and then at the boss, who said nothing until spoken to.

"Is my stuff done yet?" I asked.

"No; don't you see it is not?"

I felt insulted. How did I know that stuff was mine? I rather thought it was, for he said mine would be ready before that time. He felt mean or he would not have talked that way. I said nothing; but by keeping watch over him the stuff was ready in fifteen minutes. I intended never to patronize that man again, and I did not until I had hunted the city over and found that I could not get what I wanted anywhere else. I went back to him because I had to. I had to send after the stuff. He gave me more than he at first thought he could, he said, for the money. It came to me in a bundle; and when I unpacked it I found the raggedest lot of lumber I ever got. Such patching as I had to do! For some kinds of work the stuff could not have been used at all, and the boards were not as thin as I wanted them, or as they would have been if I had been there to watch him. To call such a man a liar and a cheat may seem harsh terms, but they are the simple truth. I think I shall send off for my stuff next time, even if I have to pay more for it.

I am not through yet, but I must stop. I expect this will go into the waste-basket, after all; but I can sell honest honey; I can keep my word; I can tell the truth, all the same, confident that in the long run honesty is the best policy.

GEO. F. ROBBINS.

Mechanicsburg, Ill., Nov. 25, 1885.

Friend R., I do think it pretty harsh to call even a bad man a liar; and if you will excuse the liberty, I am afraid you are a little inclined to uncharitableness. I used to think it was the right thing to do, to face a man and denounce him as a liar and cheat, when the circumstances seemed to warrant it; but for some little time lately I have decided that such a course so often does more harm than good, that I have resolved to be very careful about doing it any more. Further back you make the remark, that rogues sometimes prosper, etc. Now, if you have the correct definition of the word "prosper" in mind, I do not believe that rogues ever do prosper. They sometimes get money, but so does the highwayman; yet, would you want to stand in his shoes? Show up fraud and deceit unsparingly, but let us be mild and careful in our denunciations.

ARRANGEMENT AND POSITION OF THE STORES FOR WINTER.

A WINTER-NEST.

I READ, in the department of Our Own Apiary, in GLEANINGS for Nov. 1, the following: "It was just in this way that we wintered our bees last year with, however, the exception that they now have honey instead of sugar stores." Now, I think I see another very important difference. Last winter, if I mistake not, you arranged your hives and then fed syrup. This allowed the bees to place their stores as they saw proper. This year your plan gives them no choice. I believe it essential to have what Mr. Doolittle calls a winter-nest; that is, a space containing no stores in the combs on which the bees cluster. I would rather have my bees separated by a division-board than by a solid frame of honey. I fear that your only chance of success this winter is that your bees may have time to consume or remove the honey from this space before very cold weather. In our climate we often open hives through the winter, and always find them arranged with the winter-nest. If stores are sufficient, we do not average a loss of five per cent. W. H. GREER.

Paris, Tenn., Nov. 24, 1885.

Friend G., I think it quite important that the bees have this winter-nest; that is, that the bees shall cluster together in the form of a sphere, in empty cells, and then that there should be food enough so it entirely surrounds them, above and below, to the right and left, in front and rear. Our most successful wintering has been when things were in this shape, and I admit that heavy feeding just before winter seems to get this state of affairs best. Our bees have such an abundance of natural stores, however, that the conditions are pretty nearly in this shape as it is. In our locality we never have too much honey in the hives for winter, because they have ample time after the honey-flow ceases, to consume enough to give them this brood-nest. In speaking of heavy feeding, I mean that, although you feed heavily, several days will be occupied giving enough for winter.

ANOTHER FLORIDA APIARY.

MISERY LOVES COMPANY.

SEEING reports in GLEANINGS from so many places, I am moved to write an account of my own apiary, even if I have come so near getting into Blasted Hopes. The article on page 774, by that California "bee lunatic" gave me some comfort. By the way, is it not rather curious, when a person is out of luck, feeling out of humor with his surroundings, and about half displeased with himself, how quickly it will raise his spirits to hear of somebody who has not done so well as he has? I have a notion to sermonize a little right now, instead of writing about bees, but I will curb the inclination, and just say, in that line, when you have the blues, and feel as if every thing were going wrong, and you might as well quit trying, or any feelings akin to those, stop, collect your thoughts a little, look around, and see how much better you fare than somebody else. More than likely you are faring much better than a majority of poor suffering humanity.

I commenced last year with 15 stands of Italian bees, which I brought from Iowa. They increased to 42, and we took 1650 lbs. of honey, nearly all extracted. I thought I had found it, and solved the problem how that hungry spell from a pine woods to a bearing orange grove could be bridged over, at least for my family. But, alas! how uncertain are earthly things!

Last spring we started in with 40 stands. I had sold two, and left the 40 on their summer stands, with the upper stories on. They were in good condition, and commenced swarming in April. Dry weather set in about this time, stopping their supplies so they stopped swarming; and by middle of May there was less honey in the yard than when swarming commenced. It now set in wet, raining nearly every day for three months, very little honey could be stored, and only occasionally a new swarm came out. I was bothered a great deal by

loss of queens, some hives being supplied the second or third time, and, what I am most ashamed of, three colonies were lost by moths before I got them supplied. I might have saved them by timely care.

The moth is a terror here to native bee-keepers who have the common bee in old-fashioned hives; but it is a comfort to me to see how quickly the Italians will carry them out by the back of the neck, when I put a frame infested with them in the middle of an upper story of a populous hive. There is no trouble from the moth, with good management. As yet I have found no trouble with any other enemy.

We finished extracting for this year on the 18th, and find we have taken, all told, 1000 lbs. of honey; about 150 lbs. of this was comb honey, partly in sections. I found great difficulty in getting them to work in sections. They much preferred storing honey in comb already built. They sent out eight swarms, three of which flew away. One was doubled up with a queenless colony, leaving, after deducting for what was lost, an actual increase of one. The honey is worth about 11 cts. in this market; 1000 lbs. at $110.00, one new colony $6.00, $116.00.

I am very thankful for this much, and am going on my way rejoicing, and expect to do better next year; and if I don't, I still expect to keep bees, for it *has* paid even this year.

This country is high dry pine land, no swamps or hammock land nearer than four miles, about as uninviting bee-pasture, it seems to be, as there is in Florida. It will be much better in a few years, when the 40,000 orange-trees within two miles of here are full of bloom. There are many kinds of flowers in the woods and fields, but I am puzzled to know where they get the great quantities of honey they stored sometimes last year.

I find a banana-plant makes a nice shade for bee-hives. One plant will shade two or three, by setting them at different points of the compass. The leaves die in the winter, letting the sun in when it is cool. When warm weather comes again, and shade is needed, it is ready, with its great broad leaves, to make a refreshing shade. There are many good points in Florida for the bee-keeper, besides where friend Hart lives. There are many of these places where the business is entirely undeveloped, and a little well-directed energy by men well posted will surely bring its reward. It is no small thing to be entirely clear of the work and loss connected with wintering, which our Northern bee-keepers are subject to. FRANCIS TRUEBLOOD.

Archer, Florida, Nov. 27, 1885.

A DISEASE OF THE BROOD THAT IS NOT FOUL BROOD.

DESICCATED BROOD; ITS CAUSE AND CURE.

ON page 734, Nov. GLEANINGS, Mr. Dwight Furness asks me to "give further light on the subject." The desiccated foul brood that he refers to has two distinct types, or, as may be classed, a contagious and a non-contagious type — that is, so far as I can ascertain from all the investigation that I have been able to make through the seasons, beginning in 1878, up to the present fall. I have not known of a season since my first observation of the plague but that I have been able to investigate several cases of either one or both phases of the disease.

The non-contagious type I have, to my full satisfaction, traced to a trouble of the queen, or an hereditary trouble from the drone mating, as I have found it only in the worker-brood; thus I concluded it was from the deficient vitality of the drone-sperm, as a constitutional weakness. I had once thought that it might be, as inferred by a recent contributor to the pages of GLEANINGS, a venereal disease; but as such diseases are copulatively contagious, I withheld such a decision. Finding the non-contagious type always in a locality where there were plenty of degenerate black or hybrid bees, and quite often it appeared in brood of a mismated Italian queen; therefore I attributed it to the drone mating, and I can not see any reason to not credit it to the devitality of the drone sperm; and yet if the drone-brood had been affected in the same way there would not have been a chance to locate it on the vital weakness of the drone; therefore your decision of the change of the queen is a substantiation of my conclusion, and the successful practice shows the theory to be a true one in the case of the non-contagious type, and also the strongest proof to be obtained of the deficient vitality of the drone-sperm, which can be in part accounted for in two ways, as presenting itself through various observations that also bear on the subject of my article on page 742, same issue of GLEANINGS, concerning queens, and I will try to make it plain, as I see them, in an article at some future day.

THE CONTAGIOUS DESICCATED FOUL BROOD

I found to be contagious, and for three or four years I tried to obtain help from many prominent apiarists to find out something about it, and have never yet received one line of information, either pro or con, except in 1879, two letters from Mr. T. G. Newman, and I had given up all hope of any light from any one. I have kept on nursing two or three colonies for the past seven years, thinking I might yet find out all about it, and occasionallly I find localities where it has wiped out a whole apiary; and by putting healthy stocks on to the same ground, the disease always showed itself the second season. That the disease was present, I have proved by the destruction of at least 50 colonies that I have used of my own for that purpose, and always taking them from perfectly healthy localities so far as I could learn, and using new hives and virgin combs built on foundation as thoroughly clarified as I knew how to do it.

Another curious fact is, that a thorough scouring of hives and frames and fixtures with strong salt and water, just wiped out all contagion when the contagious desiccation has developed into a genuine, rotten, stinking mass of the capped brood when carried into strong healthy stocks at midsummer, and proves that the caution given, page 504, *A. B. J.*, 1883, was not without reason.

The two phases are so similar in early stages, that the novice would not notice the difference. First an occasional grub, when nearly ready to cap, will turn yellowish, growing darker for two or three days, and perishing against the side of the cell, though not always the lower side. From four to six days are consumed in the drying-up process, and then if the comb is held a little slanting in the strong sunshine a dirty sediment will be seen at the lower side of the bottom of the cell, and will

sometimes hold together to be picked out in a chunk, with a dissecting instrument. The contagious type is more firm than the other; and if a quantity is put into a cultivating-glass, and soaked up, it will grow into a thick leathery mold at about 86°. The other seems to be a dust. The contagious type is the longest in its transformations, and in many cases the larvæ are capped, but the pupæ never develop. They never have with me, and I have one case of it now, if it has not been found by other parties and destroyed, though I think there is no possibility for that.

I think that thorough investigation will show as many as six describable diseases of the brood, and that the most virulent type will yet be more manageable than a sitting hen, and less to be dreaded than either the lead-colored or red-lice-like insects that I have tried for three years to bottle for Prof. Cook, but I can not succeed, though I find plenty of them. Who else has seen the "varmints"?

South Kent, Ct., Dec. 21, 1885. H. L. JEFFREY.

Friend J., if there are really six different kinds of diseases of the brood, I sincerely trust that the most of them are not very common. I do hope that foul brood may become as "manageable as a sitting hen," but I confess to a good deal of anxiety on the subject. I have recently learned from different sources that foul brood is raging badly in the vicinity of Toledo, O., and that large honey-producers are selling the honey from foul-broody colonies, to be scattered here and there. Now, then, friends, this is indeed a serious matter. If a single package of that honey should be thrown out in the yard, after the contents have been used for food, and bees from anywhere get access to it, foul brood will be introduced, and I do not know why we should not soon have it everywhere. From your description, I do not see why you should say the disease you have is not foul brood. Is it not near enough like it so it will come under most of the rules to be observed in ordinary foul brood?

ABSORBENTS IN WINTER.

SHIPPING-CRATES.

ON page 824, Mr. Robbins solicits some "reasons for the faith that is in me" regarding the above subject. On these pages he correctly quotes one of my statements regarding my opinion of the value of absorbents. Without consuming space in detailing the many examples that have forced me to regard moisture, of itself, not unfavorable to the health of our bees during winter confinement, I will say that numerous have been the cases coming under my observation, both in outdoor and cellar wintering, that force me to such conclusions.

The great factor for consideration, I believe to be temperature; and danger comes from the falling of the same. Humidity demands a higher temperature, which, if supplied, renders it harmless, its only ill effects being secondary, at the most. Prof. Cook's allusions to this question in his Bulletin No. 8, are statements that accord with my observations and experiments.

The best report of outdoor, or, I might almost say, of any kind of wintering during the past severe winter, we receive from Drs. Southard and Ranny, of Kalamazoo, Mich. Their apiary of over 100 colonies was all outdoors, all packed with chaff, not extraordinarily thick, all with covers tightly glued on the hives, and suffered no loss. If Bro. Robbins could hear these clear, practical apiarists detail their continued experiments with absorbents vs. no absorbents, stating results, he would see just why they have discarded all of their costly cushions.

I trust that the readers of GLEANINGS have not forgotten that Mr. R. I. Barber and many others of our most successful "winterers" consider moisture either no detriment or a benefit. The reason why I said I believed upper absorbents were ofttimes "worse than useless," was because their adjustment is usually, or always, such as allows of greater radiation of heat than takes place where the packing is placed directly upon the tightly sealed board cover, and the consequent lowering of temperature is dangerous.

HUTCHINSON'S SIX-CENT SHIPPING-CRATE TO HOLD 14 SEVEN-TO-THE-FOOT SECTIONS.

I am pleased to note that Bro. Hutchinson can and will sell our shipping-crates at so low a price as 6 cents each. Here they cost more than that, and we are obliged to ask 10 cents each for them in any quantity. Even at that price we did not care to, and did not, supply them last season. In one sense you are quite correct in saying they are nothing particularly new. I have used them some five or six years, and will tell you how much I devised their construction. The first section-crate I ever saw came from New York and from Bro. Doolittle, if I mistake not. The glass ran the long (wrong) way of the crate. This glass was necessarily nearly as wide as the crate was high, and was held in place by sliding into grooves cut into the corners of the solid end-pieces. This crate held 12 two-pound sections. The two lights of glass cost more than Bro. H. charges for our little crate. This crate had to be handled wrong way to you, or have hand-holds cut in its solid ends. The latter course was chosen. The first change I made was to cut the notches for the glass in the side cleats, rather than the solid ends, and the need for only one-half as much glass was the result. I next applied the same principle to a two-story crate for 4¼ sections, and this crate was illustrated in the *A. B. J.* early in 1878. In all these crates the combs ran the long way. When I began to confine the widths of my sections to a certain number to the foot, I saw that if I made a crate just a plump foot long, making the *sides* solid and the ends cleated for the glass, such a crate would embrace the following advantages:

1. It would hold just two of the four tiers held in our storing-case, and take them just as they came from the cases, if desired.

2. It would take three sizes of 1-lb. and two sizes of ½-lb. sections, fitting all perfectly.

3. While it shows the honey sufficiently to insure due respect from the carriers and satisfy the buyer, its construction is such as to cut the cost for glass down to a minimum.

4. With such a construction the end-cleats serve every purpose of hand-holds, and at the same time admit of carrying the crates in the most convenient position; also of carrying the combs in the safest position, which is to and from the carrier.

5. It shows off the honey to the best advantage.

6. As you say on page 756, a case thus constructed is light and durable, and better protects its contents from breakage.

7. Such small crates not only ship safer, but sell more readily. With them our commission men catch a great deal of retail trade, and our retail dealers often induce a customer to take a whole crate.

This is not all; but this article is getting long, and I desire to say that when these crates are made of white basswood, nicely dressed, they are handsome to look upon. Our experience teaches us that, especially with crates and sections, the best and nicest are cheapest. Trusting that your readers clearly understand the principles and advantages of the construction of the shipping-crate in question, it gives me pleasure to say to Bro. Hutchinson's inquiring friends, as well as to all, that I gladly grant to all the privilege of making any and all of my inventions or devices connected with this crate. JAMES HEDDON.

Dowagiac, Mich., Dec. 7, 1885.

Very good, friend H., and I beg pardon for saying there was not any thing particularly new about this little case. Your seven reasons are all good ones; and while the case is nothing particularly new, it accomplishes a good many things that no other case accomplished in just that way before. You invented the case, and Bro. Hutchinson invented the six-cent price on it. We have had an engraving made, because our readers will catch hold of the special ideas so much better with the picture right before them. The question has been asked several times, if friend Hutchinson furnishes glass also with the six cents. We have replied that we thought he did not; but perhaps he had better so state it, in his advertisements or otherwise.

THE SOLAR WAX-EXTRACTOR.

THE HEAT OF THE SUN IN CALIFORNIA.

FRIEND J. P. Israel's description of his sun wax-extractor and its work (page 775 of GLEANINGS), is perfectly correct. If you will look at my article on "The California Sun-Strainer (p. 339, current volume of GLEANINGS), you will see that it was formerly used exclusively for separating the honey from the wax, here. Even now it is indispensable to any California apiarist, as all the cappings (from extracting), all broken combs and scraps, and all comb honey, which from any cause has become unsalable, may be melted up, and the honey, wax, and refuse completely separated at one process. If a chunk of wax, or an empty new comb be left outdoors in the summer, in an iron pan, or in an inverted hive-cover, it will melt and soon become bleached to a snow-white. During the summer, the iron parts of a wagon or any other article or tool of iron will, in the middle of the day, become so hot from the rays of the sun that one can not take hold of it with the naked hand. I have sometimes left a wooden paddle in the sun-strainer, and found it too warm for immediate handling. We have no need of steam wax-extractors here, except, perhaps, late in the fall, when the sun shines too obliquely to have full effect.

There has never, to my knowledge, been written an article on the sun-strainer, or sun wax-extractor, as you call it, which, as fully as the above-mentioned article of mine, describes the apparatus, its construction and use, and I think it will pay any one to read it over again, before attempting to improve on the original, or to invent something else for that purpose. No doubt, reflectors of bright tin, if properly attended to, would increase the effect; but if they are liable to be neglected, they had better be left off altogether, and the sun alone depended on to do its work through the glass.

WM. MUTH-RASMUSSEN.

Independence, Cal., Nov. 30, 1885.

Friend M., I beg pardon if I seemingly overlooked the great service you have done in describing the solar wax-extractor as you use it; but in reading your article we took into consideration the great amount of extra heat given off by the sun's rays in your State, as above, and therefore we did not feel certain that it was practicable here in our latitude. When friend Green informed us, however, that the heat of the sun is ample, right here in the North, as it were, it gave us an additional stirring-up; and while there is no need of reflectors or looking-glasses with you, it seems to me they would be quite a help here.

HUMBUGS AND SWINDLES

PERTAINING TO BEE CULTURE.

MORE ABOUT "$800 A YEAR" IN RAISING CARP.

IF our readers will turn to page 827 of our last issue, and read the communication from W. Baird, with our comments, then turn to page 829, and read "A Carp Swindle," by Milton P. Peirce, they will be prepared to connect the two after reading the following from the *Farm and Fireside* of December 1:

We caution our readers against a certain "U. S. Fish" company, nominally located at Columbus, O., and whose circulars are being distributed broadcast over the country, thanks to the gullibility of certain agricultural editors, who have given free advertising to this "Co.," through the medium of an innocent-appearing letter nominally written by one W. Baird, of Pittsburgh, Pa., in which is depicted the wonderful success a poor farmer has had in raising the mortgage from his farm by raising $800 worth of carp on an eighth of an acre of land! It is simply a new dodge of the old J. M. Bain gang, of New Concord or Zanesville, Ohio. The gang, which under its various aliases of the "North American Poultry Association," the "U. S. Incubator Co.," etc., etc., has made a most unsavory reputation. The purpose of the present scheme is to induce gudgeons to send $1 to the "U. S. Fish Co." for a "book" on fish culture. This "book," if it materializes at all, will be a pamphlet which might be worth 10 or 15 cents, if the matter it contains had any value, but which will in reality be worth just so much waste paper.

Will our agricultural papers please take notice? and if they have given publicity to this swindle, will they correct it by warning their readers accordingly?

VARIOUS MATTERS.

HOW THOSE BEES CAME THROUGH.

BEFORE me lies a card with this question on it: "Please tell us, through GLEANINGS, how the colony of bees you experimented with came through. See page 190, GLEANINGS for 1885." By turning to said page I find that the colony alluded to was the one in which I placed the thermometer the most times in getting the temperature of a cluster of bees in extreme cold weather. I there say, that I fear the experiment will cost me the colony, as they are getting quite uneasy, or words to that effect. Well, it turned out that this very same colony, which had stores of *honey* and *pollen*, being disturbed at least 12 times during the very cold weather of last February and March, proved to be one of my best colonies in May, and continued so throughout the year, giving me 112 lbs. of white comb honey and one new colony. Thus the advice, not to disturb bees in cold weather, did not apply to this colony; for in a few days after my experiments ended, I found them as quiet as any colony in the yard, and much more so than two-thirds of them were.

WHAT BECAME OF THE QUEEN?

The same questioner asks, "What became of the queen you placed under the Hill device over the colony? See page 231, of GLEANINGS for 1885." This alludes to the queen I took from a colony of bees just dying with bee-diarrhœa, which was put in a cage provisioned with Good candy, and placed in above, hoping to get her through to spring, as she was a very valuable queen. By the amount of food consumed, I judged she lived perhaps a month, but she had been dead some time when the weather admitted of my looking after her.

TEMPERATURE OF THE EARTH.

In the editor's talk on page 785 and 786 I see he places the temperature of the earth at 55°; and from what I read I judge that he gives that degree for the reason that he got the impression, either by actual knowledge or otherwise, that this was the temperature inside of the Mammoth Cave, in Kentucky. Now, while I know nothing of the temperature of the earth in Kentucky, I do know that 55° is not the temperature of the earth at 40 to 45 or less feet in depth, here in Central New York; nor do I believe it is in Ohio, where friend Root lives, so that his plan of using the heat of the earth for the growing of vegetables by means of sub-earth ventilation would not work here, I am confident. Five miles from here is a well 46 feet deep, at which I always stop and drink whenever I go that way in summer time. The means used for drawing the water is the "old oaken bucket," sang about in our childhood. Several times, both in winter and summer, a thermometer has been placed in the bucket and lowered into the water, which is from 38 to 40 feet below the surface of the earth. The temperature of this water has been found to be 41° in February and 43° in August, thus averaging 42° throughout the season, changing only two degrees between the severe cold of winter, and the extreme heat of summer. I also find that this is very near the temperature of my underground bee-cellar when all is kept quiet and undisturbed; and if I recollect aright it is the temperature given of the earth in Michigan, as given by Bro. Heddon a few years ago. I would naturally suppose that the earth in the Southern States, especially in Texas and Florida, would be warmer than where we have so much winter as we do here, which may account for the difference between Kentucky and New York. If I could have a bee-cellar which would give a steady temperature of 55°, without artificial heat, I should consider it a great acquisition.

Bordino, N. Y. G. M. DOOLITTLE.

Friend D., I am rather glad to know that disturbing bees in mid-winter has not *always* been hazardous. May be, however, you handle them so carefully that you did not demoralize them as some less expert manipulator might do.—I am very glad indeed that you have brought up this matter of the temperature of the earth. I have had one other criticism on the same thing. One other friend says the mean temperature of the earth is 59 instead of 55°. Well, we have enough careful observers among our readers of GLEANINGS to settle this matter pretty conclusively. In regard to the well you mention, I should like to ask if you saw the temperature taken, and was the thermometer one that was reliable, or only one such as happened to be lying around? The well, you say, was 38 to 40 feet deep. In the Mammoth Cave we descended to a depth of several hundred feet. It is laid down in the physical geographies, that the temperature rises one degree for every 50 or 60 feet we go down into the earth. This, you know, might make all the difference.—No doubt you are right in saying that sub-earth ventilation would not give a temperature high enough for raising plants, and I thank you for the correction; but with a little aid from the heat of the sun, and occasional days when the outside temperature is above 42°, I think we could get along pretty well. Lettuce and radishes grow nicely at a temperature of only 45°.

FOUL BROOD.

ITS MANAGEMENT AND CURE.

FROM the *British Bee Journal* of Nov. 15 we extract the article below. I hope the editor of that journal will excuse me when I say that I think our friends across the water are to be congratulated on having so able a man at the head of their journal. Friend Cowan seems not only to be fully posted in every thing relative to the bee-literature of the present day, but he also seems to have at his fingers' ends all that has been said and written in years past, in regard to even the little details of bee culture. And this is most important for an editor. How else can he direct thought, and be able to judge of what is new and original, from that which has been gone over and over? The article was called forth from reviewing friend D. A. Jones's little pamphlet with the title of our heading. I trust it is indeed true, that the phenol method can be relied upon; but I confess that my faith has been somewhat weakened by the contradic-

tory reports from its use. I shall be very glad indeed to know that destroying colonies, by fire or otherwise, when affected by foul brood, is foolish and wasteful.

In this little pamphlet the author, who is well known as one of the largest and most advanced bee-keepers in Canada, gives his experience of the treatment of foul brood by the starvation method. In his introductory remarks Mr. Jones says, that "much has been written and said on the matter." This is quite true, and perhaps more has been written and said on this very method of treating foul brood than on any other. As far back as 1767 we find J. G. Seydel, and in 1775 J. C. Voight, recommending a similar treatment. Then still later, in 1789, we find Bonner, and in 1790 Della-Rocca, both practicing it, and Quinby, in 1865, in his "Mysteries of Bee-keeping Explained," gives it as the only effectual cure. Since that time to the present, the same remedy, with very little variation, has been recommended over and over again. Although we have very little that is new to learn in the method, the pamphlet contains several interesting paragraphs which describe the appearance of brood dead from different causes. They are headed, Chilled Brood, Neglected Brood, Overheated Brood, Drowned Brood, Dead Larvæ or Brood, and lastly, Foul Brood. The descriptions are so clear that even a novice can distinguish between any forms of dead brood and true foul brood. Of chilled brood he says, "The appearance of this chilled brood, however, differs materially from that of foul brood: the larvæ are frequently found dead in all stages, from the egg to the perfectly formed bee just ready to gnaw out;" also, "that bees, almost fully developed, are found dead in the cells, retaining their shape and appearance, never sink back into that brown ropy matter which so plainly marks *pure foul brood*." Of drowned brood, he says that it occurs when colonies are placed on low ground, and when a sudden rise in the water overflows the bank of the stream, and the apiary is submerged. This brood differs from chilled brood, and, if not removed, becomes much more loathesome, and sometimes turns, he says, to foul brood, or to "what looks and acts so much like it that it must be at least a first cousin to it." He relates an instance of a man having 100 perfectly healthy colonies submerged during the months of August and September, and a large quantity of brood was drowned. The weather after this flood was warm and muggy, and all the colonies from which the dead brood was not removed became badly diseased. Salicylic acid and other remedies failed to cure, and Mr. Jones concludes that spores of the disease were in the honey, and states that "honey from the combs, when given to a healthy colony, produced the disease." He believes that "some diseases are started *de novo spontaneous*" (?), a belief that we do not share, as experiments by Tyndall and others have shown conclusively that there is no such thing as spontaneous generation, and that disease-germs must exist before they can be propagated. In describing foul brood, the author says that it "is a disease *in the honey*, or, rather, that is where it appears to lurk." We confess, that, even under a powerful microscope, with a one-twelfth oil immersion objective, we have never been able to detect the spores of foul brood in honey, nor has Mr. Cheshire; and although honey has usually been supposed to be the medium through which foul brood has been propagated, we are not prepared to indorse the opinion that it is the only way. Mr. Jones says, that "combs containing foul brood can not be used; at least, I have never been able to use them; no amount of doctoring that I could do would disinfect them." He says, freezing even at as low a temperature as 35° below zero did not kill the spores, and combs and honey after this freezing, when given to a hive, produced the disease, and warns bee-keepers never to attempt a cure by that method. Boiling the honey, however, for a few minutes, he says, failed to transmit the disease, and concluded by saying that, "after many trials, I proved beyond doubt that heat *will* kill the germs by which the disease is generated."

To understand the error of this reasoning, it is necessary to know something of the nature of the disease. In 1874, Dr. Cohn, than whom there is no greater authority, and whose classification of bacteria has generally been adopted, first pointed out that foul brood is caused by a *bacillus*, and subsequently Professor Schönfeld and others, as well as the recent experiments of Mr. Cheshire, have conclusively corroborated Dr. Cohn's statement. Now, we know that freezing destroys most bacteria, *except* the spores of bacilli, which, according to Dr. Klein, survive exposure to as low a temperature as -15° C., but that no spores survive a temperature of 120° C., so that we can quite believe that, at an ordinary Canadian winter temperature, the spores still survive. On the same authority we also know that most bacteria are killed if they are exposed for several hours to a temperature below 50° to 60° C. But here, again, the exceptions are the spores of bacilli, which require, according to Dr. Cohn, an exposure to the heat of boiling water for as much as half an hour before they are destroyed. Therefore ordinary boiling for a few minutes, as recommended by Mr. Jones, does not destroy the spores. We have no doubt that, in the hands of such an experienced bee-keeper as the author, this method has proved sufficiently satisfactory; and it is certainly an improvement on cremation, or total destruction of bees, hives, and combs, which Mr. Jones, having paid dearly for the experience, so severely condemns, having, if our memory does not deceive us, when foul brood first appeared in his apiary, sacrificed two or three hundred stocks in this way. But we would go a step further, and save not only the bees, but also combs and hives. Knowing as we do that the disease is caused by bacilli, we have simply to destroy these or prevent their development. Cold and heat will not do it; but salicylic acid, thymol, phenol, etc., prevent, even in great dilution, the growth of the micro-organisms; and practical experience has proved that, by using them, we can save whole colonies. We have known large apiaries, where foul brood was raging fearfully, cured entirely by means of salicylic-acid fumigation according to Hilbert's plan in one season, with much less trouble than any process of starvation could have done. Phenol, likewise, first recommended by Professor Butleroff in 1874, and subsequently by Gravenhorst, and latterly by Mr. Frank Cheshire, has also been proved to cure the disease. In the face of these facts we can not counsel our readers even to destroy their combs. In the last paragraph Mr. Jones recommends fasting, and describes his *modus operandi*.

His method is to shake the bees from the combs of the infected hive into an empty box, and to place a wire screen over the top, to close the entrance, and then carry them to some dark repository (a cellar if possible), turning the box on one side so as to have the screen at the side to allow the air to pass through. Darkness and a cool temperature are important, as also that all the bees should be equally filled with honey. They are to remain in the dark repository until they show signs of hunger. This they will do in from four to six days, and they must be carefully watched three times a day after the third day, or they are liable to die very quickly. When sufficiently starved, which is known by some of them dropping down and crawling about in a slow, quiet manner, they are shaken in front of a hive prepared with some combs, and are allowed to run in just the same as a swarm. If there is no food in the combs the bees should be fed. The combs of infected hives should be melted into wax, and hives and frames boiled for a few minutes. The honey should also be extracted and boiled for a few seconds, and can then be given to the bees. The author further says he has never known the disease to be contracted by either queen or drones. Mr. Cheshire, however, has found both, as well as the workers, to contain bacilli; and Hilbert, in 1876, at the meeting of the German National Bee-keepers' Association held at Strasburg, in describing his method of treatment, stated that bees and queens exposed to the vapors of foul brood contracted the disease, and that the fungus (*i. e.*, bacillus) of foul brood could generate in the body of the bee. Even the ovaries of the queen have become infected. In twenty-five hives treated by Hilbert he found three such queens. We have ourselves found the juices of workers, when examined under a high power of the microscope, teeming with bacilli. We, however, recommend the pamphlet to our readers. It is written in a pleasant style by one of the most able bee-keepers in Canada; and they will find in it much to instruct, more especially the paragraphs describing the different appearances of brood dead from various causes. We thoroughly sympathize with his concluding remarks, that "Destroying colonies afflicted with foul brood by fire, or otherwise, we consider a wanton destruction of property."

In regard to foul brood lurking in the honey, I did not suppose its presence could be detected by the aid of the microscope; but it has been carried to healthy hives so many times by the bees robbing foul-broody colonies, it has generally been taken for granted that the contagion is carried with the honey. Feeding even liquid honey from foul-broody stocks has also repeatedly started foul brood, if I am not mistaken.

A DRONE-LAYING QUEEN.

A MICROSCOPICAL DISSECTION OF.—BEES STEALING EGGS.

ON the 15th of October, 1884, I packed in chaff or sawdust, on their summer stands, 16 strong colonies and 10 nuclei, of which I lost none during the winter. In the spring I sold four strong and two weak colonies, and lost one by robbing, while I was away from home. I was gone less than three hours; but during that time the colony was overpowered and destroyed. So I began the season of 1885 with 12 strong and 7 weak colonies. The latter I used for queen-rearing and for experiments. One of the experiments was to test the value of a drone-laying queen. In the fall of 1884 I received from Italy a very fine-looking queen, which the dealer said was a choice queen from his own apiary, and an excellent layer. She began laying in one week after her arrival here; but every egg, though laid in a worker-cell, hatched a drone. Thinking that she might have been injured in transit, and that possibly she would be all right in the spring, I gave her brood from other colonies, and wintered her. In February she began laying drone-eggs in worker-cells. During March and April I gave her colony several frames of worker-brood from other queens; then by placing empty drone-comb in the center of her colony I hoped to get some early drones. See did lay a few eggs in this comb; but with her queenly wisdom she insisted on going away from the center of the brood-chamber, and laying most of her eggs in worker-cells; but they all produced drones.

I kept her until in June, when I gave up the experiment, and destroyed her. On microscopical examination, the ovaries presented a normal appearance; but the spermatheca was empty and atrophied, appearing like a little knot or wart upon the oviduct. I have no doubt of the *thorough* honesty of the dealer from whom I obtained this queen. What caused her failure?

From the 12 colonies run for honey I obtained 600 lbs. of extracted and 500 lbs. of comb honey. Most of the extracted I have sold at 12½ cents per pound. Some I have retailed at 15 cents per lb. The comb honey I have sold mostly at 20 cents per lb., some at 25, the whole bringing $185.00 here at home, or a little over $15.00 per colony for those run for honey. From the 10 colonies, spring count, I now have 51 packed for winter.

I am testing the wintering qualities of the different races of bees by placing stocks from imported queens side by side, under as nearly identical conditions as possible.

Two experiments last season convinced me that bees can and will steal as well as sting—at least they can and will procure eggs for queen-rearing when no queen is in the hive. In looking through colony No. 18 on the 25th day of last April I found they had neither queen nor brood. They were left as found, and on May 10th I examined them again, when I was surprised to find three queen-cells—one with a larva almost ready for capping (it was capped the next day), one with a larva not more than one day old, and one cell with an egg in, which hatched May 11th. There was not another egg nor larva in the hive save these three, neither was there any queen. Myself and two others looked carefully over the combs time and again. May 14th I gave the colony a frame of brood and eggs, and May 16th the cell that was capped on the 11th was found opened at the end in the regular way, while the two others were opened at the side. One had a dead queen-pupa in, while the other had been entirely emptied. I also found a fine virgin queen, evidently but a few hours old. May 26th she began laying.

LEVI C. JOHNSON.

Fountain City, Ind.

WHAT MUSICAL NOTE REPRESENTS THE HUM OF A BEE?

ALSO SOMETHING ABOUT THE FISH IN FLORIDA.

TELL Mrs. Chaddock that orange-trees bloom in February. If she wants to peddle oranges, she ought to be here now. The butcher brings them around every week in his meat-wagon, and sells them at a cent apiece, very fine ones too.

Ernest has begun to teach the juveniles to use their *eyes*. Tell them to use their *ears* too, and find out what note in the musical scale a bee hums on while gathering honey. If they know enough about music to run the vocal scale, do, re, mi, etc., they can easily determine.

When I was at the lake this morning, two bees came down for water, and one hummed on A, and the other on C.

How the juveniles would enjoy seeing the fish in our beautiful clear lake! They come rushing toward the bank, eager to be fed. One will dart off with a piece of bread in his mouth, and twenty others, perhaps, will chase him just like chickens, only their every motion is grace itself, and the sunshine glints on their sides and makes them shine like silver. They are of all sizes, from an inch long to eight inches. They leap half way out of the water, if real hungry, catching at the crumbs that float on top. They are bream and trout. The children are very careful not to frighten them, and I have seen the tiny ones eat out of baby's little hands, as she held the crumbs in her palm under the water. The larger ones are shy.

We had quite a large frost this morning, which turned the banana bushes black; but I notice the geraniums are all green yet. I have one in the front yard, ten feet around. The bees were carrying in pollen to-day, but I don't know where they got it. It was of a reddish yellow.

George asks, if he will write and tell you what note a bee hums on, will you send him Silver Keys?

Stanton, Fla. VISTA A. REDDING.

Thanks, my friend, for suggesting this matter in regard to the pitch of the note emitted by a bee's wings.—And so you do have frost in Florida, do you?—Tell George we will send him Silver Keys as soon as we get a new lot. We have disposed of a thousand, but I think we can easily use a thousand more.

WHAT TO DO, AND HOW TO BE HAPPY WHILE DOING IT.

Continued from Nov. 15.

CHAPTER IV.

Get wisdom, get understanding.—PROV. 4:5.

In these former chapters I have gone over many things in regard to heat, in order to give you a general idea of the many ways by which we may make use of the heat contained in the immense storehouse in the bowels of Mother Earth. Improvements are constantly being made in this matter of counteracting the frosts of winter, in some of the ways mentioned above, or by a combination of these different plans. Natural caves offer very great advantages indeed; and where they are near large towns or cities, I should say they could be very profitably utilized for furnishing constant supplies of air, warm enough for the purpose of growing many kinds of vegetables, or keeping domestic animals in comparative comfort.

There is still another plan, brought forward recently, of utilizing the heat from the warm or hot springs that are found in many parts of our country. The warm water of these springs can be conveyed in pipes under ground, so as to give us the advantages of a tropical climate, even in frosty regions. Where a warm or hot spring is found near to a large city or town, it ought to be very valuable for such purposes.

HEAT FROM THE CONSUMPTION OF COAL AND WOOD.

Most of us are so familiar with this kind of heat for warming greenhouses and buildings, that I need not dwell on the matter here. Besides, it will come up naturally as we get further along.

LIGHT.

We have already pretty thoroughly considered the subject of light, in connection with the heat from the sun's rays; in fact, the two are almost inseparable. In planning to secure the direct rays of the sun, however, for raising plants, we need a little more light than can be obtained from these direct rays. For instance, we want our plants close up to the glass, in order to get as much light as possible on all sides of them. If you were to permit the sun to shine into the back part of a cave, you would get enough heat, but not light sufficient. Even though the sun shone directly on to the plant, it would commence at once to stretch and reach forward, to "get out of the hole," as it were, indicating its desire to get close up to the glass, or, if you choose, to get out where light would come to it from all sides. Our first greenhouse was built with a solid, opaque roof, on the north side. I did this, thinking that, as no sunlight could come directly through it, there was no need of going to the expense of glass. The result was, the plants under this north roof, although right in the sun, always leaned over to the south, and I was obliged to put them in movable boxes, which could be turned end for end every few days. On this account we want glass over the whole space above the plants, although the north *wall* may be opaque, and have double walls, with an air-space between them. To get all the light possible on all sides of our plants, we also paint every thing white. You will be surprised to see how much lighter a room becomes by whitewashing or painting all the objects or furniture white. Where plants are raised in the window, of course we have to turn them around to keep them from growing one-sided, and they do very well under this treatment, only it is somewhat laborious, where there are many boxes. Making a little room about the plants, and covering the walls with white paper, gives us more and better light. Sometimes hanging up white sheets around the plants will accomplish the same result.

As an illustration of what may be done with very cheap and common appliances, we take the following from the *American Agriculturist* for Jan., 1885. You will notice, also, that the friend who did it is occupied with office work, so that it was all done during odd spells that would probably have been spent in some sort of amusement that would have left no tangible result of any kind. It was to him a pleasure and a pastime, like building my monument.

STARTING A VEGETABLE GARDEN.

In the fall of 1883 I purchased some second-hand 4×6-foot common window-sash, at $1.00 per sash, and built a lean-to structure on the south side of the barn, using four of the sash laid lengthwise for the roof, and two for the front side. The ends were sided up with matched inch stuff, allowing for a door at one end. Notches were cut through the cross-pieces of the top sash, to allow the water to escape. This gave a space inside of about 7 by 12 feet, allowing 2½ feet for the

two side benches, set three feet above the ground, and a pathway of two feet. On the side next to the barn were two benches consisting of two scantlings placed lengthwise, on which were shallow boxes filled with earth. This plan allowed of turning the boxes occasionally, so as to give each side an equal amount of light. About midway of the outside, or front, was a small self-feeding parlor stove, such as may be found among the second-hand stoves at almost any hardware store, and bought for five dollars. The stovepipe passed out through one of the apertures of the sash, fitted with tin, and extended upward eight feet, to give sufficient draft. A large amount of heat might have been saved by having the pipe run lengthwise of the building, though an even temperature of 60 to 70° was maintained during the daytime, and from 10 to 15° less each night. The fire was started Feb. 22, and never went out until May 5, consuming about three-fourths of a ton of coal. In this structure I started about 4000 tomato-plants, 2000 cabbage, and a quantity of pepper, celery, and lettuce plants. When sufficiently large, the plants were placed in hotbeds or cold frames outside. This enabled me to delay starting my hotbeds for such tender plants as tomatoes and peppers, until the latter part of April, and still have large stocky plants for outdoor planting by the middle of May. Early cabbage and cauliflower plants were transplanted into cold frames and made fine plants. "hardened off" sufficiently to set out April 20. My first sowing of tomato, cabbage, and cauliflower seed, was made Feb. 15. Subsequent ones were every four or five days. Plants of the later sowings were transplanted into cold frames, and protected at night with straw mats. The lettuce, besides being put into cold frames, was set out between early cabbages and cauliflowers in the open ground April 20, and made fine heads several weeks earlier than outdoor sowings. As I am engaged with office work during the day, the time devoted to the greenhouse was principally mornings before eight o'clock, a few minutes at noon, and at evening. The total expense of building the greenhouse and fixtures, heating, etc., was less than $20.00, and my book shows a cash receipt, from plants sold, of over $140.00. This includes receipts from late cabbage and turnip plants which were sown outdoors. The actual receipts from stuff started in the greenhouse show a profit of over one hundred dollars.

The time devoted to this work, besides being profitably spent, was more a pleasure than a task, as any one at all interested in horticultural matters generally takes enough pleasure in "watching things grow," to more than compensate for time and labor spent. I have gained many ideas from the past year's experience, which will doubtless greatly aid me toward greater success hereafter. G. H. M.

WATER.

A good deal has been written in regard to watering plants; and my own experience has satisfied me that, to water successfully, we must imitate nature. Sprinkling the plants constantly does not answer. In nature we have soaking rains, and then several days of sunshine; and I have never had any better results in watering plants than can be obtained by dipping the boxes or pots into a tub of water at about the proper temperature (say 55°, the temperature of the earth), hold them under the water until the soil is thoroughly soaked, then set them out to drain off. Of course, the pots or boxes should have ample arrangements made for drainage. Don't dip them again until the soil is found to be so dry that they really need water. Let them really *want* it, before you give them any more. Where plants are in beds in the greenhouse, flood the beds until the ground is soaked in the same way; then let them dry off. Circumstances must decide how often they are to be watered. If the sun shines every day, of course they will need watering a good deal oftener. The temperature of the room or the weather has also much to do with it. Sprinkling the foliage so as to wash off the dust, and keep the little breathing-pores in the leaves nice and clean, is, of course, a good thing. This imitates the dews of night. In watering plants outdoors we want to imitate the soaking rain; but, don't pour so much water right around the stems of the plants as to make a puddle, that will bake down hard. The usual way of watering, as they do in countries where irrigation is the rule, gives the best results. Make a little channel between two rows of plants; start the water in where the ground is highest, and let it run until it has soaked the ground clear up to the plants. Don't get on too much. Then turn it off, and wait until the plants really need water again. We usually prefer soft water to hard, though I can not see any particular difference, except that when the leaves and foliage are sprayed with hard water, it sometimes dries on them so as to leave a whitish precipitate. If a cistern is put in the center of your greenhouse, and all the water from the roof be conducted into it, it will usually give you all the water needed to water the plants. During severe cold weather, the water in this cistern may be warmed by a steam or hot-water pipe, and this will aid very materially in keeping an even temperature. The cistern may be under one of the benches; and if the water stands up within a foot of the soil above it, all the better. Such a cistern also aids in keeping a moist or slightly damp atmosphere.

SOIL FOR PLANTS.

What kind of soil is best for raising plants?

or, how shall we make or get the very best kind of soil? is a question that comes up constantly to young and old lovers of plants and flowers. So far as my experience goes, I believe I should place stable manure ahead of all other sources. Have it well rotted, so it can be raked up fine. If you can not get it well rotted, get what you can and rot it. Almost any experienced farmer or gardener can tell you what kind of stable manure is needed. Next, I believe I would have this stable manure composted, and mixed with decayed sods. Get sods from the roadside, or anywhere; pile them up in heaps until they are thoroughly rotted, and then mix them with your stable manure. In regard to the best kind of earth, I know of no better way than to get samples, in little boxes, of such soil as is procurable around you, and test it. I once got a wagon-load of earth down near the creek, that had been washed from a fertile hillside, or gradual slope. Some of them laughed at me for my pains, saying that my dirt was not good for any thing. But it grew plants better than any thing else we had. Woods dirt and decayed leaves are often collected with great care, and probably we shall find nothing better than decaying leaves. In view of this I think it is a very good speculation to rake up and pile in heaps all the leaves we can get hold of. Use them for bedding for the cow, horse, pigs, and even poultry. Cover the floor of the poultry-house with leaves to the depth of a foot, then scatter their feed in the leaves, and make the fowls dig it out. When the leaves get broken up fine they will absorb and hold the manure or the droppings from the fowls, so as to make them comparatively inoffensive; and the resulting compost is just the best kind of manure you can procure. If a peat-bog is near you, you can use vast quantities of peat in just the way I have mentioned with leaves; but it should be thrown up in heaps or long ridges, to let the frost break it up fine and draw out the water. If your soil is of a kind that crusts over on the surface, and bakes, by stirring in the peat you can get rid of the baking, entirely.

Go all over your neighborhood; hunt up every thing that can be found, in the way of material that can be converted into manure. Get some experienced farmer (that is, if you are not an experienced farmer yourself) to tell you how much it would be safe to offer for old manure-piles; then when you have purchased them, scrape up carefully, with hoe and rake, the very ground on which the manure rested, and draw that away to put in your compost heap also. Get weeds, bog hay, and every thing you can lay hold on—refuse from the slaughter-houses, spent hops from the breweries (if you are so unfortunate as to have any such institutions near you), and waste material of every sort, in fact; and be sure you are not making a mistake. Make a test of all these things, as far as possible, before you buy any of them. Keep testing different materials and substances by growing seeds in little boxes, until you find what materials give the best results. Feel your way before you, as it were, so as to avoid making expensive blunders.

Now, before going further I wish here briefly to say something that touches on all the facts we have been over. In fact, it includes this matter of saving not only all the manures and fertilizers, but the summer showers and the winter snows, and all these gifts from God that are daily going to waste. It is, in short, a brief notice of a new book just published, entitled, "The New Agriculture; or, the Waters Led Captive," and we will take the latter part of the title for our next chapter.

CHAPTER V.

Can the rush grow up without mire? can the flag grow without water?—Job 8:11.

You will please bear in mind that the book was not received and read until after the foregoing was in type.

THE WATERS LED CAPTIVE.

This book, with the above title, has just come out within the last few weeks, and its author, Mr. A. N. Cole, of Wellsville, Allegany Co., N. Y., is an enthusiast on the subject of growing plants. Although he is a prominent character in political circles, he has, nevertheless, nearly all his life made the subject of plant-growing a hobby. When he was but a boy he got hold of the well-known experiment of growing a great crop of cucumbers in a single barrel. Perhaps many of our readers have tried it, and many more have heard of it. The way he did it was this: He procured a good-sized

barrel, sunk it half way in the ground, and filled it half full of round cobble-stones. On top of the cobble-stones was placed brush, then some straw, then a good deal of manure, mixed with nice rich earth. On this earth the cucumbers were planted in the ordinary way; and when the roots were long enough to go down among the cobble-stones, the barrel was kept constantly filled with water. Several conditions were necessary to insure the greatest success, so he made several trials of the process before he succeeded in getting nearly half a barrel of pickles from the plants that grew in a single half-barrel of compost. I presume the bung-hole of the barrel was left open, to guard against hurting the plants by too much water. In that case, if the earth should be soaked, no matter how wet, the surplus would flow out of the bung-hole, leaving the soil like any nicely underdrained soil, while the roots of the plants would always be able to help themselves to any amount of water required, by simply going down among the wet stones.

By the way, there seems to be something particularly attractive to the roots of plants in wet stones or damp gravel. Many of the friends who have practiced underdraining know how the roots will go down into these underdrains, and follow them for many feet. Friend Peirce, in his carp-book, speaks of the trouble he has had with outlets to carp-ponds, by the roots of the trees getting into the pipes, and filling them up. Well, there is nothing particularly strange about this experiment of raising great quantities of cucumbers with a little very rich compost and plenty of water. But here is the strange part of the experiment, and the one which fixed the attention of young Cole, and made this matter his life-study. That one hill of cucumbers in the barrel, during the hot days of July, when the plants were making their greatest growth, actually drank up *half a barrel of water, in only three days!*

Does it astonish you? Well, it astonished me somewhat; but when I gave our people at the noonday service an outline of friend Cole's wonderful invention, one of our men told me after dinner that he himself had done the same thing; but that, although he had not measured the quantity of water needed, he had no doubt that very rank, thrifty-growing vines, would take quite the amount mentioned. That is over 10 gallons of water a day, for a single hill of cucumbers. In other words, this one hill of plants drank up over three patent pailfuls of water every 24 hours, or nearly half a gallon an hour; or, to get it right before us, a pint of water every 15 minutes. As it is likely that more water was used in the daytime than after nightfall, at some hours the amount perhaps exceeded even this. I have before called your attention to the fact that much of our garden stuff is largely composed of water. Green cucumbers may be 80 or 90 per cent water; and if the plant is going to yield bushels, of course it must have water to drink. Do you feel like saying, "Well, who wants so many cucumbers, any way?" I reply, strawberries, during the height of the fruit season, use almost as much water as cucumbers do; and friend Cole has been selling strawberies at *a penny apiece*, because they were as large as ordinary peaches; he did not raise them in barrels, though, and this brings us to the discovery.

A few pages back I talked to you about saving the rain and the snow, as well as the sunshine. Well, friend Cole has just "gone and done it." His garden is on a hillside, and he has made it to bud and blossom in such a way that the people of the surrounding country have got in the way of calling it "The Home on the Hillside." Our place is called "The Home of the Honey-bees," so you see there is something a little parallel in our experiences. For several years the idea has haunted me, that we ought to save the water that comes down from the clouds, store it up somewhere, and use it during our dry summers to give drink to our strawberries, cucumbers, etc. I talked about constructing a reservoir upon the hill near our house; but our land is so expensive here close to town that I could not well spare the room it would occupy. Besides, after I had got it made into a pond, it is expensive business running it over the land, even by the best system of irrigation. To see what had been done in the matter, I sent and got the little book, entitled "Irrigation Applied to Farms, Gardens, and Orchards;" but after studying the book for two or three years thoroughly, I became discouraged before I ever set about it. The author discouraged me by giving actual facts from experience, of the expense of irrigation after the water was obtained. You can not do it in one season so it will last, but it has got to be done continually. Friend Cole started out with the bold idea of *covering up* these reservoirs to hold the rain, and raising garden stuff *right over them*. I had thought of this too; but the expense required to cover a

small pond, so it would not break down and cave in, discouraged me again.

Shall I tell you how he does it? He just digs reservoirs across the side of the hill. These reservoirs are, in fact, nothing more than deep wide ditches. These deep wide ditches are then filled with round cobble-stones, just on the plan of the cucumber-barrel. When he gets within 18 inches of the surface of the ground, he covers the cobble-stones with thin flat stones, then he puts on brush, straw, etc., and then nicely prepared soil. Of course, this is to be done only where there is a clay subsoil that will hold water; but this condition can be found on almost every farm or garden. The depth, width, and distance apart of these reservoirs must depend on circumstances. But this new book recommends that they should be about 2 feet wide, 3½ deep, and two rods apart, for farm purposes. For market gardens and small-fruit growers, they may be 5 feet wide and 5 feet deep, and not more than a rod apart. In that case the ground will all be thoroughly underdrained; and during the severest droughts he claims the growing crop will never suffer for water; for a reservoir, say 3½ feet in depth, and three or four feet wide, placed under 18 inches of rich soil, if filled with water in the spring, would probably hold some part of it until along in the fall; that is, in retentive clay soil.

Each reservoir is to have its bottom on a level. For instance, you will commence on the highest point of land, if it is a hill or knoll, run your reservoir clear around, so it will be in the shape of a letter O with a spot of solid ground in the center, not to exceed two rods across. If the hill is oblong, of course your reservoir, instead of being in the form of a circle, will be oblong; that is, it is to conform to the lay of the land and the shape of the hillside. Now, one rod below this another similar structure is to be made. Now comes the question, How shall the overflow from the first reservoir pass into the next one below it? Friend Cole accomplishes this by means of some smaller ditches made in the same way, filled with smaller stone. These smaller stones are raked out of the soil when it is broken up fine, as it has to be for gardening and fruit-raising, and these smaller stones, or coarse gravel, act as a filter. The cross-ditches are a foot or two less in depth, and the surface of the small stones is covered with flat stones like the others, this flat-stone shingling being all of it at least 18 inches below the surface, so that no ordinary plow or subsoil plow will tear it up. You will notice that the surface water filters from the first reservoir into the second; from the second into the third, and so on, until you come to the outlet. I hardly need tell an intelligent man that, if he puts the filthiest kind of water into the upper reservoir, by passing through so many gravel filters filled with roots of hungry plants, he would have nothing but the purest kind of spring water when it got to the outlet; and such, in fact, proves to be the case. The roots of plants are superior to any filter of charcoal, or any thing else, for removing all organic matter from the water that passes over it.

Those who visit friend Cole's garden on the hillside, and find strawberries as big as peaches, and plums as large as apples, a good many of them claim that his wonderful success is owing to the thorough way in which he digs the ground up, and makes it fine and mellow to the depth of 18 inches. This is in friend Terry's special line, as you may remember. Of course, while he is digging it up fine to get *out* the gravel, he also digs *in* a plenty of good manure, forest-leaves being one of his favorite products for fertilizing the soil. I presume he manures his five acres (for that is the extent of his little farm) very much as market gardeners usually make their ground; but he has obtained results away ahead of what market gardeners do.

Of course, friend Cole is an enthusiast in this new development, and very likely we should make some allowance for his enthusiasm; but for all that, I think he is destined to be called a public benefactor. As I have no means of testing personally his claims at the present writing, I can only state to you what seems to be sufficiently attested by many witnesses. Ground thus prepared and worked up is much less liable to the effects of frost than ordinary soil; for this large body of water so near the surface gives off its heat, and warms up the mellow soil above it. Secondly, his plants are rank and green much later in the fall than those on ordinary ground, and they also start out earlier in the spring. It seems to me likely that, if a natural spring could be turned into a reservoir, and allowed to pass down through, it would still further aid in keeping off frost. While heavy snows cover the ground, friend Cole says his strawberry-plants grow all winter, having their roots safely anchored among the wet stones in the reservoir. I suppose you are aware that steam has been used for years to furnish heat

for hotbeds, in place of fermenting manure. Well, with this arrangement, letting steam into the reservoirs, we furnish bottom heat for early plants very cheaply. If instead of water we say hot liquid manure, we have manure and bottom heat, just as they do with manure from hotbeds.

Perhaps I should add, before closing this subject, that friend Cole has a patent on the process; but after reading his book, I for one feel quite willing to pay him for the privilege of testing, say an eighth of an acre, on his system. Even if we do not use all his plans, I think we can, in this matter of growing plants and vegetables, made use of at least a great many of his suggestions. His invention seems to be providential, also, in a sanitary point of view; for these reservoirs take up and utilize all manner of filth, and standing water is out of the question. Only a few days before the book was received, I was feeling somewhat dissatisfied with our underdrains during this wet season, because it took them so long a time to get rid of the surface water. We wanted to bank up our celery, fix up our cabbages and turnips, and ridge up our ground so the frost could make it fine for us; but the ground was so wet and sticky everywhere, it seemed out of the question. After we have prepared our ground on friend Cole's plan, however, we can dig in it all winter if we want to. We expect to use the eighth-acre we are going to prepare, for raising early cabbage, celery, tomato-plants, etc.

Now, if some of you should write me and ask if I would recommend that you pay out money to go into this new kind of agriculture, I would say, unhesitatingly, *no*. If you can dig the trenches yourself, or if your men do it at times when they would do little or nothing else, by all means do it. Most of you probably have stones on your premises that you would be glad to get rid of, so you would certainly accomplish something in this direction. It certainly can not be any bad speculation to bury the stones that cumber your ground, where they will be out of sight and out of the way. For a garden-patch I would get a screen, or riddle, such as is used for screening coal, and screen or sift all of the ground in the garden, to a depth of 18 inches, or fix a small bed thus screened and pulverized, until you see how you like it. In working among plants, having the ground in beautiful order enables one to do more than double the amount of work; and all successful gardeners now advise manure without stint.

If we will only call to mind incidents familiar to most of us in regard to this matter, we shall see that it is not at all unreasonable. As an illustration, when we were planting our basswood orchard one end of the lot was disfigured by a cellar where a house had formerly stood. To fill the cellar up, we picked all the stones off the field and threw them in, big and little. Then we threw in all sorts of rubbish over the whole, plowing and scraping the dirt around the sides of the cellar until the ground was level. To get the ground in order, we planted corn. While planting the corn, I made the remark that it would "probably be of little use to plant any over that old cellar, for there is nothing but lumps of hard clay—not a bit of fine dirt." But just for the fun of it I let some corn rattle down through the hard yellow lumps. I didn't even stop to bring some mellow soil to put over the kernels. They just rattled down into the crevices between the clay, out of sight. The corn came up, and for a while looked yellow and spindling; but by and by the color began to change, and pretty soon it towered away above the rest of the field. The old cellar held water, and the corn-roots got down into the stone-pile and into the water; and even though the ground they stood in seemed to be the poorest kind of hard clay, the corn on that spot where the cellar was, was the finest corn I ever saw. The stalks were like trees, and every one contained two or more mammoth ears.

On our premises we have not the stone needed, without drawing them quite a distance, which, at this season of the year, would be more expensive than to purchase fragments of stone at the stone-quarry. We have just been offered such fragments for $2.00 a carload; that is, a carload of 20 tons, the quarrymen offering them at this low figure in order to get them out of the way. They also offer a thin kind of slaty stone for covering that may be easily split to any thickness desired, for $6.00. We shall use this material for fixing our eighth-acre, and the result of this experiment will be reported during the coming season, before this book of mine is complete.

With a suitable one-horse plow, and scraper to match, the excavating may be done almost entirely by horse power, or horse and man power combined. The nature of the soil has something to do in the matter. If the scraper is not at hand, or there is not much to do, loosen the dirt with a plow and throw it out with shovels by hand.

CHAPTER VI.

In the sweat of thy face shalt thou eat bread.—GEN. 3:19.

This book, you know, is to tell you what to do when you are out of work, and also how to be happy in doing it. Now, I think a good many people spoil their chance of happiness by being too ready to give up to bad weather, a slight indisposition, and other like difficulties in the way of making every day count a good day's work. Last night we made all plans for excavating dirt at a rapid rate by the use of a team early this morning. In fact, I asked the hands to be ready, if they could, as soon as it should be light enough to see. We were making an outdoor cellar for fruits and vegetables. Remember, it is now the 5th day of December. Well, in the night I was awakened by the fierce howling of the wind, and was not surprised when I went out before daylight to find the ground partly covered with snow, and a fierce storm of wind and snow from the north-west. Everybody shivered, and told how dreadful the weather was. I ran over my help mentally, and decided which ones would be likely to be willing to go out in the storm. I did not expect any of them before daylight. But I did go out and work half an hour myself with pick and shovel, to see how much the ground was frozen, and to see, also, how disagreeable it might be to work out such a day. I want to explain further, that I have been lately feeling a touch of my old malady; and when it was time to get up in the morning, my joints felt stiff and sore, my throat warned me of the approach of the hard cold that for a year back has been some way hanging about me much of the time, and I had a sort of feeling that may be has oftentimes tempted other people, even before they are fifty, to think, "Well, I am fast getting to be an old man, and it would be nothing strange if my best powers, both of mind and body, were passed by. Probably ten years more and I shall be all gone to pieces, or laid in my grave." Did you ever have such a feeling? What did I do? Get up late, and drag around after I got up, with a kind of long-faced, mournful air and gait? No, sir; I did nothing of the sort. I went and shoveled dirt until I felt perfectly well, had a big appetite, and it was breakfast time. When I got over to breakfast, the baby had the earache, and the others were so long in getting up, on account of the cold, I was informed that breakfast would not be ready for fifteen minutes. I went back, and found one or two of the most enterprising of the men, and made arrangements to have the team and plow and scraper start at once. I was told we had no scraper suitable for the work to be done, and borrowing one was suggested. I do hate the very thought of borrowing tools — especially such tools. Our neighbor across the way had just such a scraper as we wanted, but he loaned it to Mr. A., and Mr. A. loaned it to Mr. B., and Mr. B. said Mr. A. took it home; but Mr. A. said Mr. B. took it home, while my neighbor across the way said it had not been brought home at all, although it was loaned months ago.

"No, boys, don't borrow any scraper at all. We will take that old one that we used to fill underdrains with, and try to make it work for to-day."

They felt pretty sure it would all come to pieces; but I told them we would plow the ground up very mellow, and take small loads, and thus avoid not only breaking the scraper, but fretting the horses. It is now half-past nine, and the scraper, in the hands of careful men, is doing splendidly, even though the thermometer is only 19 above zero, with the wind blowing almost a gale. The dirt moves beautifully, and the hands, after being once warmed up to their work, don't find it disagreeable. When I went to put on my stockings in the morning, I found one of them wet, on account of a hole in my boot, and that accounted for the bad feeling in my throat, and rheumatic twinges in my joints. I put on some dry stockings, a pair of overshoes, an old overcoat, and a pair of woolen mittens that my good mother knit for me last winter, and I enjoyed working in the dirt so much that I feel like laughing at my feelings of the morning. I have not only all my natural energy, but I feel stronger this morning than I did when I was twenty-five or thirty years old; that is, I feel more like shoveling dirt and holding a scraper now than I did then. More than all the rest, my heart is full of thanks toward God that I am permitted to work outdoors when I know my health is suffering from too little

just such exercise in the open air. I am not only full of love toward God, but of love and charity toward my fellow-men.

Do you want to know the moral of this chapter? It is this: If you want to be happy in doing the work that lies before you, get up bright and early, even if it is stormy. Clothe yourself warmly and *wisely;* then go out into the storm, and do whatever has to be done until your whole physical body glows with the effects of exercise in the cold wintry air. Then shall you find despondent and dismal feelings gone; and if your experience is like mine, you will find your aches and pains are gone too. Work in the dirt, even if the dirt is freezing. It is cheaper than doctors' prescriptions, and more wholesome and profitable every way. If the work to be done is something that your heart is in, you will soon be full of enthusiasm, for you will be in your natural and normal state. Now, then, don't say you can't get ready for the gardening operations of next year because the weather is too bad. If you have already something on hand more profitable than the work I have suggested, then you do not particularly need this chapter.

It is now four o'clock. As the storm continued unabated, when the noon hour approached it seemed even more important that our excavating for the time be finished to-day. I knew it was rather unpleasant to work out of doors; and so at the noon service I mentioned the reason why I was anxious to have the work done, and suggested that if any of the men employed in other departments of the factory would like to take a couple of hours digging the dirt, I should be quite glad of their services. Before half-past twelve, one came forward saying that he would work in the dirt if I wanted him to, and then another and another, until we had all the help wanted; and by the time I got back from the Saturday afternoon prayer-meeting, the work was safe from the weather, and a roof of boards placed over it.

Just at this time it was suggested that some apples in an out-building were in danger of being frozen. By the way, before I get through with these talks, I expect to have a chapter on apples. Well, one of the men handed me an apple, telling me it was frosted on the surface a little already. It was a Peck's Pleasant; and if I had been governed by my feelings at the time I tasted of that apple, and I had been appointed to decide which was the best apple in the world, I should have unhesitatingly said, "Peck's Pleasant, by all means." Why, the flavor of that apple was most exquisite. I do not know that I ever tasted of any thing in my life — apple or any thing else — so *wonderfully* refreshing and delicious. Do you know why? Bless your heart, I had been working in the dirt, in the frosty air, until I was full of animal spirits, and just a little thirsty — just where I could appreciate to the fullest extent a nice apple. It was just frosty enough to make the juice cool and refreshing. Ice-cream and ice-cold lemonade are nowhere. Do you see the point? One who sits in the office all day, reading agricultural papers and letters from the farmers, can no more enjoy to the full a good apple than any thing in the world. Perhaps everybody is not like myself; but God made me to stay outdoors — at least a great part of my time. There is a short verse in the first chapter of Isaiah that reads this way: "If ye be willing and obedient, ye shall eat the good of the land."

At another time, when I had been at work out in the frosty air, one of the men was pouring some California honey into a can. It was so cold that it did not run well; but it was beautifully transparent for all that, and I thought I would just sample it. The honey was like the apple. It seemed to me that everybody ought to go into ecstasies over the exquisitely beautiful flavor of this mountain-sage honey. Why, if it would not have been undignified, and out of place, I should have thought it the proper thing to swing my hat and thank God for such a beautiful gift to man. I think this kind of honey was some that my friend R. Wilkin, of San Buenaventura, Cal., sent me; but as it had been standing in that can a year or more, I had never thought before about its being particularly nice. It was not the apple, nor was it the honey. It was just *myself*, because I had been out of doors, pushing ahead with mind and muscle in exploring God's gifts. My friend, do you think it a hardship because God has said, "In the sweat of thy face shalt thou eat bread"? I do not. I thank him for the privilege.

To be continued Jan. 15, 1885.

He that is faithful in that which is least, is faithful also in much.—LUKE 16:10.

MYSELF AND MY NEIGHBORS.

EXCELLENCE OR CHEAPNESS—WHICH?

Through wisdom is a house builded.—PROV. 24:23.

WELL, little friends, the convention of bee-keepers of North America have appointed your humble servant to give them a talk about excellence or cheapness; and as the talk I propose is to be a sort of neighborly chat, I thought I would just put it in here for you to read.

I do not know but that this subject was given me because some of the brethren think I have been a little too eager to recommend cheap tools and appliances; and may be they thought I would defend my side of the subject while somebody else would take up excellence rather than cheapness. Now, it seems to me that wisdom and experience should guide us in this matter, and that we can not very well lay down *general* rules for purchasing bee-supplies, or for *purchasing* any thing else, in fact. Isaiah tells us, in his first chapter, to "learn to do well;" that is, doing well is progressive; and I should also say, learn to purchase wisely. If you have got a little money that you want to invest in bee-supplies, don't be in a hurry to get rid of it all. Our text says, "Through wisdom is a house builded;" and I should say, through wisdom we make prudent purchases.

Suppose a boy gets big enough to need a knife. What kind of a knife should he purchase—a five-cent knife or a two-dollar knife? Why, I should say it depends upon who the boy is, his age, and what he wants to do with the knife. But with the average boy, I think it would be a pretty good idea to try the cheap knife first. Even if he has laid up a couple of dollars to buy a pocket-knife, I think he will get more satisfaction by trying a cheap one first than by trying the two-dollar one first. If the cheap one does not please him, nor answer his requirements, it would not be very much expense to give it to some other boy, and try a little better one. Let him carefully *examine* and test each knife he buys, until he becomes a tolerably good judge of knives, and is able to purchase understandingly.

There are a great many people, and good people too, who have a way of saying, in regard to every purchase that comes up, "The best is the cheapest." A good deal depends upon what you mean by *best*. Suppose you want a hammer. There are hammers in the market, for only five cents. They are not loose nor rickety either, for they are made all of one piece of iron; and although they may be awkward and cheap-looking, they will do a vast amount of service for many kinds of work. They cost so little that if somebody borrows one, or loses it, it does not matter much; and I have found it quite convenient to have these cheap hammers scattered all around the premises. We have one down in the barn, and one in the stable out in the lots. The children have them to crack nuts; and, in fact, there are so many of them on the premises that whenever you want some sort of hammer for just a minute, you can almost always get hold of one of these, without going a great way or hunt-

ing very long. But, do you think I would give a good mechanic such a hammer to put up hives with? By no means. In putting up hives he uses a hammer almost constantly; and if I could find a hammer *worth* five dollars, I would give it to him without hesitation; for if it were worth only *a cent a day* to him more than a cheap hammer, it would soon pay for itself. For this same reason a good mechanic ought to have at least three hammers, and *three good ones*. Now, when I say I would give a hammer worth five dollars if I could find it, I do not mean that I would buy one that is silver-plated, or has inlaid work in the handle, and things of that sort; neither would I give him a hammer that had a great amount of unimportant work put on it. One of our large railroad companies paid $60.00 (I think it was), for a dozen hammers to be used by some of their expensive men. These hammers were all worked out by hand, and were very handsomely made. I do not believe it will pay many bee-keepers to use tools or appliances made in this way. When he gets to be so well off in raising honey and bees that he has some money he really does not know what to do with (I wonder if there are any such here to-day, friends), it may be just the thing for him to do, to buy a six-dollar hammer to make hives with, because, you know, "the best is always the cheapest."

Suppose somebody of limited means wants to try bee-keeping. What kind of a colony of bees should he buy? Without knowing any thing about the general habits of the man or woman, I would say, let them get the cheapest colony of bees that could be found in the neighborhood, thus saving expensive transportation charges, and also making their purchases of friends and neighbors. Then I would advise getting an Italian queen; but as I have said before, if one is new at the business, and, may be, likely to make blunders at first, I would tell him to get an untested queen. After he introduces her all right, and gets her to laying, if she does not turn out well in every way, let him try a higher-priced one next time, working progressively; and my experience convinces me that the best way in the world to get any thing of this kind is to get it *progressively*. *Learn* to do well, not undertake to come up to the highest standard all of a sudden. There is far more enjoyment in making a little more improvement every day, than in stepping into great things, even if it could be done. The same with hives. I would first get a cheap hive—say a Simplicity. When winter comes, get a hive suitable for winter, even if it does cost a little more; but save your old Simplicity for your increase when spring comes again.

If you are going to make hives, start out with few tools, and purchase judiciously each new season, as you find you really need to. Do not get any thing to be put away on the shelves until you may need it. Purchase what you need, and no more, until you have pretty surely demonstrated it would be prudence to purchase larger lots for the sake of getting better prices. If you have worked with comb foundation enough to know that you want to use it largely, you can, from past experience, usually figure out how many colonies you will need to have, to think of buying a foundation-machine.

There is another point to be considered right here. Sometimes cheap tools and cheap machinery make us so much bother and worry that they spoil all the pleasure of trying to keep bees; whereas a high-priced tool or a high-priced machine would go right along, without any hitch or accident, in such a way that the work would be only pastime or "fun," as the boys say. Where one's time is valuable, or where he already has many cares and responsibilities, nice tools or nice machinery all in perfect working order is by all means the most satisfactory, and, I believe, the most profitable. This latter point comes in more with tools or machinery that is necessarily somewhat complicated. We had some experience in this line in making and sending out rubber plates for making foundation. While *we* made the machines work nicely here in the factory, and while a few of our customers were pleased with them, the majority found there were so many conditions to be observed, and the whole arrangement was so uncertain in its results, that I have always regretted that I advised any thing of the sort. The same remarks will apply with force to home-made honey-extractors. We have for years sold the inside work, so that the friends who wanted to economize could save something by attaching it to an ordinary tin can or barrel; but as a rule, I believe they found it more vexation of spirit, and perhaps more expense in the end, than to have purchased an extractor all ready for use. Where one has a great many bees, and a good market for extracted honey, perhaps friend Stanley's automatic extractor will be found to be cheaper than any other.

In regard to bee-feeders, my experience has been in favor of something very plain and simple. One of our bee-friends once made a remark in jest in one of the journals, that every bee-feeder and bee-hive, according to *his* notion, ought to have "cog-wheels," slides, and levers, somewhere about them. Now, "cog-wheels" work very nicely in a warm room on a winter's day; but when you get out in the apiary, among the bees, about harvest time, when every thing is crowding, the said *cog-wheels* seem to be somehow out of place. Let us have our implements plain, simple, and substantial; let us pay enough for them to have every thing exactly as it should be—hives and frames interchangeable — every thing so it will work easily and surely; no sticking nor jamming nor pounding to get things in place.

In regard to utensils for honey, I believe the demand seems to be in favor of cheapness—tin pails that are to be given away, as well as crates to hold our comb honey. Sell the honey for so much, *package and all*. But even though we give them away, let us have them well enough made to be sure there will be no leaking nor daubing.

In regard to honey-knives, I would advise, as I advised the boy with his first pocket-knife. If you have few bees, and don't expect to go into the business largely, you can

make a 10-cent garden-trowel do your uncapping very well for quite a while. When you need a better uncapping-knife, get it.

In regard to perforated zinc, and things of this sort, don't include any in your first purchase. Wait until you feel the need of such new implements. May be you will never need them at all.

Even though I advise economy in purchases, I would have every thing that stands out in the weather painted. If you say you can not afford it, I would have half the number of hives, and have them protected from the weather by paint, rather than increase so fast, and have the weather constantly spoiling my implements. Besides, I would pay *something* for the sake of having things look decent and in order. A great many times, nice-looking implements encourage us to renewed energy; and sometimes just a little extra energy makes all the difference between success and failure, or profit and loss.

Every man who has honey to sell ought to have some sort of scales to weigh it on. The family steelyards will do to start with; but whenever you begin to take time enough in the course of a year, in using steelyards, to pay for a pair of scales, get the scales, but don't get them sooner, if you are cramped for means. When your business increases so that it will pay to have still better scales, get them. Don't waste the price of a good article in bothering with a poor cheap one.

In regard to seeds for honey-plants, go slow, unless, indeed, you are a farmer, and can raise alsike, buckwheat, rape, or raspberries, so as to make it a paying investment aside from the honey. If you can do that, by all means raise honey-plants. I am led to make these remarks, because some of the new friends seem to think the first thing to be done in starting in bee culture is to get a pound of figwort seed, and four or five pounds of the spider plant, just because these plants yield honey in such quantities as to be visible to the naked eye. Buy a five-cent package of these seeds first; and if they please you, plant more the next year, by which time you should have seed of your own raising.

In regard to sections for comb honey, as the appearance of this product has a great deal to do with the price obtained, I think it very likely that the *best* is the *cheapest every time.*

When you find you need a smoker (and you may need it the first day you can call yourself the owner of a small colony of bees), I should say, try a cheap one to start with. But perhaps you can decide what you want before you buy by examining them at conventions, or testing those used by your neighbors. I say this, taking it for granted that bee-keepers are always *neighborly.* Is it *not* so, friends?

In regard to hiving-boxes, I have sometimes thought I would about as soon have a half-bushel or peck basket fixed to a pole, as to have any of those in the market. May be, after having tried them, though, you will think differently.

When your business arrives to the dignity of requiring a steam-engine, it will pay you to look into the matter very carefully. If you *can*, go and see the engines made near you. But as I said before, be sure you need one before you get it. If you are doing your own work, decide how cheaply you can afford to furnish power by treading a foot-power machine. Whenever an engine would save you $25.00 a year for power, if you can raise the money to buy it, without cramping yourself, buy one of one or two horse power. When you need a larger one, you can, as a general thing, dispose of the smaller one, or turn it toward another one as part payment.

While some folks get along nicely without any veil at all, others save time and save their nerves, by using veils. The same may be said in regard to gloves, although for myself I should certainly never use the latter among bees; and if I had the *entire* management of an apiary, I do not think I should ever need a veil. Cheap home-made veils will answer a very good purpose; but there are no gloves that will do, except the regular rubber gloves made for the purpose.

Prudence and economy would dictate some sort of wax-extractor. But don't buy one until you have discovered you need one. If you commence on a small scale, as you by all means should do, I would get a cheap one first.

TAKING CARE OF THE TOOLS YOU DO GET.

Now I am going to talk a little on the above, even if the subject has not been assigned me. A cheap, low-priced tool may be so well *cared for* that it will always give excellent results; whereas, the most expensive tool may be so *badly used* that it will very soon give *poor results.* Have for your tools regularly assigned places. Where any tool is wanted in different places, I would have duplicates. For instance, cheap brushes for brushing off bees should be in handy places in the honey-house, and in several places about the apiary, at least during the summer time. The same may be said of hammers. Do not leave any kind of tool out in the rain. Keep every kind of tool not only well oiled on the moving parts, but oil it to prevent rust. Oil the hinges to the door of your honey-house. Rub tallow on the windows so they will slide easily up and down. Keep your lawn-mower nicely oiled, and out of the rain. Have your brooms hung up in broom-holders so the ends will not get rolled up and made useless; and keep the brooms out of the rain also. If you use a wrench, keep it nicely oiled and in place. And this matter of oil is of so much importance that I would have cheap oil-cans filled with oil, on nice little bracket shelves in the barn and in the stables. A little box should also be there, filled with tallow, where it can be had in a moment. A great many times the oil-can or the tallow will enable you to use a hand-saw so as to do the work in half the time it would if you had not used it. With steam-engines, and machinery for hive-making, oil is a necessity; and those who neglect to have it handy will sooner or later have to pay heavy bills for repairs that a few drops of oil might have saved. Nails and screws of different sizes should also be kept where you can put your hand on them quickly. Whether you are a bee-keeper or not, you need screw-

drivers and adjustable wrenches, where any of the children can get them in an instant, if you tell them the tools are wanted in a hurry. And, my friend, as you value the future happiness and comfort of those children, teach them to be sure these things are put back in their places as soon as you are done using them, if you should forget it yourself. A girl five years old can easily save the time of a man and a *team*, may be, by knowing where to find a wrench or an oil-can; and the little girl will get it, and put it back, quicker than a big man could. That is one reason why I like little girls, and little boys too, because they can help such a "big lot," when they get into the way of helping, and when their papas make friends with them. I wonder how many of the papas to whom I am talking to-day are in the habit of making friends with the little chicks at home. Why, if you don't you lose half the pleasure of success in business. When a big crop of honey comes, and the prospect is before you of being able to pay off debts that have worried you, what a rare pleasure it is to be able to tell the children about it when you tell mamma, and have them rejoice and clap their hands too!

There, friends, I thought I was going to make a very short talk this time; but somehow, when I got a going it "talked itself." Good-by.

MRS. HARRISON TALKS TO THE JUVENILES ABOUT PETS.

WHAT SHALL BE THE CHARACTER OF THEIR LETTERS?

MY DEAR JUVENILES:—I take a great deal of comfort reading your little letters, where one says she has a kitty, and another a bossy. Some older persons may think your letters of little account, but I do not. I feel quite frisky, although I have lived in Illinois half a century, and in Ohio awhile—I shall not tell you how long, though.

I am not too old to go to Sunday-school. I was there last Sunday, and two strangers were there, and wanted us to form a "Humane Society;" that is, a society whose members promise to be kind to everybody, and to the horse, cow, dog, or cat; oh, yes! to the elephant, lion, tiger, mud-turtle, and every thing that lives — even to little boys who throw stones at our windows, and steal our grapes.

My dear children, your pets do you a great deal more good than you are aware of. Some persons who belong to the Humane Society visited the penitentiary—not one, but a whole lot of them, and asked the prisoners who of them had pets when they were little children at home. Would you have believed it? not one ever had any—not even a cat to purr around and rub against his legs, or a pet toad to live under the doorstep. Don't you pity these poor fellows who had nothing of their own to love, and so their hearts grew hard and wicked? I am almost afraid to join the Humane Society, for at their meetings they ask the members who have hurt any thing since the last meeting, to raise their hand. I am afraid I should have to stand up and say, "A bee stung me, and I hit it and killed it." And when the president asks me what made the bee sting me, I should have to tell "the truth, the whole truth, and nothing but the truth," and it would be this: I went to their hive, jerked off the roof, jarred and banged around, scaring the poor bees out of their wits, who thought their home was about to be torn down over their heads, their babies killed, and their honey all eaten up.

Are the bees to blame, when they try to drive me off, and shoot at me with their tiny guns? Our country's laws protect us in our own homes, giving us leave to shoot or drive off persons breaking open the doors to steal from us; and should not the bees have some rights too? If a person knocks gently at our door, we open it, politely speak, ask him to come in and "take a chair." If I treat my bees as politely, do you think they would sting me? or if I ask their permission, by gently tapping at their door, and am not boisterous or rude, and have no irritating odors about my clothing, from bee-poison? I have tried to be kind to my bees in a general way. I have fed and watered them, and made warm bed-clothes for them; but I am going to try to be kinder still—treat them more politely, wouldn't you?

My bees go to a public well near by, and sip the fresh water from the gravel; they are attending strictly to their own business, and do not sting; yet boys who gather there kill all they can. Where there are new houses building, and they have beds of mortar, bees sip from it, and boys with little paddles spat every one they can, down into the mortar. Is this being humane?

Peoria, Ill. MRS. L. HARRISON.

Well, now, really, Mrs. Harrison, I did not intend that our little friends should not tell about their pets, and confine themselves to bees, instead. My purpose was to avoid a little sameness in their letters, and at the same time give them something useful to do. Perhaps I put it a little too strongly, and gave a wrong impression. If I did, I heartily beg their pardon, and thank you for your seemingly indirect, but kind criticism. You notice that the juveniles still mention their pets in their letters as before, but yet I think they should not be inserted unless of some interest. We have more letters than we have room for, and we think that only the best should go into print. It seems hard, I know, to show partiality to our little friends.

A society like that you mention has only recently been formed here in Medina for the suppression of cruelty to children and animals. Father and myself are members. Each member is expected to report promptly any act of negligence or cruelty, to the marshal.

I agree exactly with what you say about pets for children. There is something so innocent about these little dumb creatures about us that God surely intended by them to teach his little folks lessons of love and purity. The younger members of our family take great comfort with those baby-rabbits that Caddie told you of. When I was quite small I used to spend hours with my rabbits and doves; and when perchance one of my pets was killed, I would sit down and have a big cry over it. I don't think it hurt me either. By all means, let the boys and girls have their pets. Such harmless amusements will tend to keep them from associating with bad company, and make them love all God's creatures. ERNEST.

Every boy or girl, under 15 years of age, who writes a letter for this department, CONTAINING SOME VALUABLE FACT, NOT GENERALLY KNOWN, ON BEES OR OTHER MATTERS, will receive one of David Cook's excellent five-cent Sunday-school books. Many of these books contain the same matter that you find in Sunday-school books costing from $1.00 to $1.50. If you have had one or more books, give us the names that we may not send the same twice. We have now in stock six different books, as follows; viz.: Sheer Off, The Giant-Killer, The Roby Family, Rescued from Egypt, and Ten Nights in a Bar-Room. We have also Our Homes, Part I., and Our Homes, Part II. Besides the above books, you may have a photograph of our old house apiary, taken a great many years ago. In it is a picture of myself, Blue Eyes, and Caddy, and a glimpse of Ernest. We have also some pretty little colored pictures of birds, fruits, flowers, etc., suitable for framing. You can have your choice of any one of the above pictures or books for every letter that gives us some valuable piece of information.

"A chiel's amang ye takin' notes;
An' faith, he'll prent it."

YOU are taking hold nicely in the problem which I gave a short time ago. So far we feel tolerably certain that a bee dies after having stung, and that, too, a few hours afterward; but let us have more reports until we are absolutely certain. While these things are important, little folks, there is something else that I wish to call your attention to.

Did you ever see a bee that acted as though he were real mad, and while buzzing before your face fairly boil with rage until you think that he has almost a human temper? I wonder if a bee ever tries real hard to control himself. I presume not; for how could he know any better? We have an old horse, Jack, by name, that will lop his ears flat upon his head, and his eyes seem to be ablaze with evil spite. There is one particular thing that he doesn't like to do; and this is, to back. He can't see the need of it, and will, if he can, smash something by one big lunge backward. I wonder if *he* tries to control himself.

Little boys and girls act very much like those dumb creatures. They have their good days and bad days; they have things they don't like to do; they have their spells of being cross at every thing. Sometimes, when Huber is a little naughty, we ask him if he is a good boy. "No, bad boy," he will say, while his face, with a dignified expression, shows that he meant what he said. I wonder how many little boys have just a little of the fire that a bee has. The little bee probably does not *know* that he is doing wrong; but God loves his little children vastly more than he does the bee or the horse, and he has made the little boys and girls to *know* when *they* are good or bad.

Now, little friends, see if you can't please God and help your mother by trying real hard. Some time you will find it not so easy when you get old, if you don't begin now. When you are asked to do something that is disagreeable, not only do it, but see what a pleasant face you can have while doing it. If the bee or the horse doesn't know it is right to control himself, you do. ERNEST.

150 SWARMS KILLED BY BLACK HONEY; MEXICAN PONIES.

My papa takes cousin Caddie and me down to the River farm, where he keeps bees, when it is warm and pleasant, and gives us lots of honey. This year it was real nice; but last year it was black, and we did not like it. Papa said the bees gathered it from the leaves of the trees, and it killed 150 swarms for him last winter. On the same farm we have a pony, and it has a little flesh-colored colt with pink eyes. Papa thinks it's a daisy, and perhaps I am going to ride it some day. MABEL HARRINGTON, age 7.

Medina, O., Dec. 1, 1885.

I will explain that Mabel is Neighbor H.'s daughter, and she is also a playmate and cousin of Caddie. They are nearly of a size and age. As I was going up the street yesterday I saw them a little ahead of me, and I declare I could not tell "which from t'other."—Yes, that colt of cream color and pink eyes is a real beauty, and is what bee-keepers would call an albino. His mother is a mustang, and was caught right off the plains. Neighbor H. used to let me ride her around horseback.

I remember once that she took fright at something, and made a bee-line through the apiary whilst I, clinging to her back, began to see visions of broken hives, stinging bees, and myself bleeding and mangled upon the ground; but the reality never came; and by some strangely unaccountable way I could be seen a moment after on her back, up the road. As a moral, I would advise inexperienced horsemen to be careful with Mexican ponies around the apiary. ERNEST.

PUTTING HONEY AMONG THE BEES, WHEN THERE IS NONE COMING IN.

Pa has one hive of nice Italian bees. I think they are very pretty. We put some honey around the bees, but they were not working much that day. When we put the honey out there you could see the Italian bees begin to come first. VICTOR COX.

Chocowinity, N. C.

Placing honey among the bees after the honey-flow, is a little risky. It would very likely start robbing, then you would have no end of trouble. So you think the Italians will more quickly scent the sweet, than the black bees, do you? ERNEST.

WHO ARE CADDIE AND ERNEST?

Please may I ask who Caddie and Ernest are? I don't believe I ever heard who they are. My father has but one stand of bees. They are Italians, but he is going to get some more. My brother has some very nice chickens, and he is going to raise more next summer. I got a letter from Nellie Rossiter. CLARA MADSON.

West Branch, Ia., Nov. 13, 1885.

Why, of course you shall know; but I kind o' hate to talk about myself, because it would hardly be the proper thing. However, I will say that Ernest and Caddie are a brother and sister of Huber. Huber, you

know, is an "off-sprig" from the old "Root." Perhaps I should say further, that I have been away to school for the last four years, and in consequence you have not heard from me much during the time. Caddie is a blue eyes, next older than Huber.

ERNEST.

DO GRASSHOPPERS EXTRACT THE SWEETS FROM THE FLOWERS?

This is my first letter to GLEANINGS. Ma has 64 colonies of bees, and sister Maud has three stands. We did not get very much honey this year. Ma thinks it is because there were so many grasshoppers. She thinks they sucked all the sweets out of flowers. They nearly destroyed some meadows, and some fields of corn had hardly a silk left on the ears. HAMILTON DUNCAN.

Limeville, Iowa, Nov. 9, 1885.

FROM 145 TO 215, AND 7000 LBS. OF HONEY.

We have 215 hives of bees. My brother does nothing but attend to them. I help to make cushions of wool to keep them warm in winter. My brother thinks that is the best way to protect them. I also help to clean sections and crate them. We did not lose many bees last winter. Our bees did not do as well this summer as other years. We got only about 7000 lbs. from 145 stocks, and increased to 215. My pa takes all the bee-papers, but I read only GLEANINGS. NELLIE CORNELL, age 13.

Lindsay, Ont., Can.

BRINGING A SWARM DOWN BY WATER.

Friend Ernest:—Seeing you have charge of the Juvenile Department, I will try writing once more. Pa had six colonies of bees in the spring, and increased to 15. We extracted 242 lbs. of honey. We did not get any comb honey. Pa has his bees packed in chaff hives. Last summer our bees swarmed and were going away. I saw them, and told pa. We ran after them with water, and brought them down by throwing water on them. They alighted on a cornstalk in the middle of the cornfield.

CORA BURTON, age 13.

Goodwine, Ills., Nov. 23, 1885.

AN INTELLIGENT CAT.

I do not think there is any thing about bees that I could tell you, that you do not know already; but I am much interested in the children's letters in GLEANINGS. We have your picture in the A B C book, so that I feel quite acquainted with you. My mother has six stands of beautiful bees; they are packed with chaff cushions at the sides and on top, and we hope they will winter well. We have a white cat that is intelligent and musical. Whenever the parlor door is open he jumps up on the piano-stool and plays first with one paw, then steps on the keys, up and down the keyboard. His eyes fairly laugh with the fun. When mamma plays, he goes up on the top of the piano, and sits looking in her face, and purrs as loud as he can.

I think you are very kind to print the letters from the children. I am going to try to get you some new subscribers. FRANK BREWSTER, age 10.

Pequannock, N. J., Nov. 23, 1885.

CATCHING A 2-LB. PICKEREL.

I have been so interested in your accounts of your carp-pond that I think I will tell you about our fish-pond. It is situated about one hundred feet from the Pequannock River, and there is a brook of nice clean water running from the pond to the river, all the year round. A few week since I went down there early in the morning and saw a large pickerel going slowly up the brook from the river to the pond. The water was so shallow that its back was out of the water. I caught it in my hands. It fought well and escaped twice, but finally I brought it home. It weighed over two pounds.

There are pike, pickerel, sunfish, suckers, black bass, and white fish in the river, but only a few go up to the pond. I get quite a string of fish sometimes, by using a hook and line. Nets are not allowed in the river. There is a fine of $25.00 for putting a net in the river.

BERT R. BREWSTER, age 11.

Pequannock, N. J., Nov. 23, 1885.

POLLEN AND ITS CHARACTERISTIC COLOR, AS GIVEN BY THE VARIOUS FLOWERS.

I will tell what I *think* I know about pollen. On corn and ragweed it is light green; buckeye, very dark red; red clover, dark green; basswood, yellow; maple, red; hollyhock, white; elm, light yellow; thistle, light yellow; pumpkin, yellow, almost white; locust, light yellow; goldenrod, dark yellow. I got the scissors and Bible that I sent for, and I was very much pleased with them.

Woodstock, O. NETTIE H. CRANSTON, age 11.

Friend Nettie, your letter deserves a chromo too. I wonder how many of the big bee-men can tell the source of the pollen, from its color. I think it would puzzle a good many to do as well as you have done.

ERNEST.

ANOTHER RUNAWAY, IN WHICH FIVE HIVES ARE KNOCKED OVER.

My papa is a bee-man. He began two years ago, with ten swarms. He has 31 swarms now, and got about 1500 lbs. of honey. Nov. 8th there was a runaway which went through his apiary and knocked down five hives. The combs of four of them were mashed nearly all to pieces.

Last summer I watched the bees while papa was at work in the garden. Once when the bees were swarming I held the hiving-box, covered with bees, for him. I have a friend, Cora, with whom I go to school, and play. ETHEL F. WILCOX.

Northfield, Minn., Nov. 18, 1885.

Why, friend Ethel, your experience of a runaway horse through the apiary was quite similar to the one we had. You say the combs of four of the hives were "mashed nearly all to pieces." From this I infer that you do not have your combs wired, as we do in our apiary. During the recent mishap of which I told you on page 765, scarcely a comb was broken. We should be glad of more facts as to how the bees behaved, and the cause of the accident. Friend Miller, page 811, tells us how to quiet horses that have been stung. We should be glad of more reports of this kind. ERNEST.

A SAD STORY; JUST REWARD FOR STEALING BEES.

I have a sad story to tell you. Two young men stole a good stand of bees from pa one night, 2½ years ago, but we did not find it out then. One of the same boys and two other ones broke into a store this summer, and took a lot of goods. Two of them were sent to prison a few days ago, and one of them got away from the jailor. They may get him yet. They all live in this little town, and have mothers living, who cried about them; but the men took them any way. Pa and I went by the jail. I saw

the big iron bars. It looks as if it were built to keep wild beasts in. I want to be a good boy, and not get drunk and steal, and grieve ma's life, as those boys did theirs. I have one stand of bees, and got 126 lbs. of extracted honey from it. Pa had 11 in the spring; has 70 now. I have a big pig.

Georgetown, Ill. SAMMY LINDLEY.

SUDDEN DEATH OF A COLONY FROM FEEDING.

One of our neighbors fed dark syrup to a stand of bees at 11 o'clock, and at 12 they were all dead.

Ferndale, Cal. GEORGIE SPAULDING, age 9.

HONEY NOT FIT TO EAT.

One of our neighbors had a lot of bees, and they made beautiful white clear honey; but when they took out the honey they could not eat it. It was made of laurel and wormwood and fennel.

Ferndale, Cal. MAGGIE SPAULDING, age 11.

A KIND WORD FOR GLEANINGS.

I will write to you, and tell you something about our bees. We have about 200 hives of bees. We got about 8000 or 9000 lbs. of honey this year. Papa takes GLEANINGS, and he says he couldn't get along without it. ADA MCPHAIL.

Gallinas, Texas.

THE LOSS OF TWO COLONIES.

Pa put two colonies of bees in the cellar in the fall, and they were looking well until lately he looked at them and found them all dead. They had plenty to eat, but it was too wet for them. It wouldn't be such a loss if there were any more bees near here. These two colonies cost at least $25.00. If any of the readers of GLEANINGS are dealers in fruit-tree seeds, please send price list of seeds, especially Russian mulberry, grapes, plums, and crab-apples.

The bee, the bee, the busy bee,
Gathers honey off flower and tree,
He toils and toils the livelong day,
But never has he a word to say.
When the sun is far in the west,
Not the bee doth stop to rest.
Never doth he taste of rum,
Nor does he get drunk, as some.

Ellensburg, W. T. J. D. SEATON.

WHAT BEES DO WHEN THEY GET DOWN LITTLE BOYS' BACKS.

I have got my ma to write for me, for I can't write, but I like bees. I like to watch them gather honey, and to see them go in the hive with their legs loaded with pollen. My pa's bees came out one day this winter, and I was out to see them, and there were two got down my back and stung me. I have been through my First Reader once, and going through it again. I have one pet, and that is a cat.

Cameron, Pa. EARNEST WYKOFF.

"THROWING GROUND" TO BRING DOWN A SWARM; HOW A JUVENILE MANAGED.

In 1883 pa and I went in the lot to cultivate potatoes. We then saw a swarm of bees flying over us. We ran after them till we got past them. We threw ground amongst them till they clustered on a little bush. Pa told me to watch them while he went home to get a hive; and while he was gone the bush got heavy and bent down, and the bees dropped off. They commenced to fly. I was afraid they were going off, so I covered them with my hat; and they all clustered in it. When pa came he just shcok them in the hive, and then we left it there till night. Then pa and brother John went and got them. MICHAEL ZEHR, age 14.

Indian River, N. Y.

KING-BIRDS KILLING BEES; CATCHING BUMBLE-BEES.

My father had 18 swarms of bees last fall. Two of them died this winter. One of them had no queen. The king-birds would come and eat the bees last summer, but George and I would shoot them when we got a chance. Sometimes they will stay up on the tall trees, but sometimes they will come down. George, my younger brother, used to catch bumble-bees and shut them up in a hive, but they would not stay. There are lots of wild ducks that come in the pond, and we boys stone them.

Cameron, Pa. WILLIE WYKOFF, age 13.

CUT STRAW AND SAWDUST FOR PACKING; HOW TO TELL RIGHT SIDE UP OF SECTIONS.

Papa has 120 swarms of bees, packed with cut straw and sawdust, on their summer stands. He got about 5000 lbs. of comb honey and a good deal of extracted that we did not weigh. You can always tell which is the right side up of a section of honey; for unless the sections are turned over on the hive, the bees always leave the largest holes in the lower corners. LUCY HURLBUT, age 9.

West Bethany, N. Y.

A SELF-MADE MARTYR; A BEE LIVED JUST FOUR HOURS AND A HALF AFTER HAVING STUNG.

Seeing that you had proposed to the juveniles the plan of removing the sting from a bee, to see how long he would live without a sting, I was so much pleased with the idea that I at once tried it. I went out into the apiary, and attempted to catch a bee; but just before I could capture one, a little fellow that had been buzzing unpleasantly near my ear concluded to be accommodating and save me the trouble of catching one of his companions; so he flew at me with an angry "*whiz*," and popped his sting into my hand. Of course, his fate was sealed, so I caught him and put him into a queen-cage, and then put the cage on top of the combs in the hive. Before putting the cage in the hive, I put a few drops of honey in it. I put the bee in at half-past eleven o'clock A. M. and he lived until four o'clock P. M., so you see the poor little fellow lived only four hours and a half. I hope some of the other juveniles will try the experiment.

Our bees have done exceedingly well this year. Papa ordered a lot of iron-jacket cans, to put his honey in. He received them the other day. He gets all of his apiarian supplies from you.

FLORENCE BOLES.

Church Hill, Miss., Nov. 17, 1885.

Well done, little friend. I am going to tell our mailing clerk to send you a large and beautiful chromo, which will be in addition to the book already sent you.—So you really are a self-made martyr to the cause of science. I wonder if that little bee, when he stung you, knew he was going to die; if he did, don't you think he was a martyr also to his dear little home? Or do you think he was just like little folks sometimes are, when they feel a little mad and want to give somebody a "dab"?—Your bee lived four hours and a half. Hulda Myers' (page 791) lived seven hours. Now let us have quite a number of reports upon this point, until we shall have this matter settled. To every juvenile who gives an answer to the problems I gave in Oct. 15, page 711, we will send a nice present. ERNEST.

30 SWARMS AND 1200 LBS. OF HONEY.

My pa has 30 hives of bees, and he got 1200 lbs. of honey, and thinks he could have got 2000 lbs. if he had had time to take it. Pa thinks rape is nice for bees in the fall, as it blossoms, and bees work on it, until snow comes. Pa once buried a swarm of bees like potatoes, with straw six inches thick all around them, and some dirt over, and the snow drifted over them two feet deep, and in four months he took them out and they were flying all around him before he could get them out.

BESSIE GREEN, age 8.

Montague, Mich., Nov. 30, 1885.

A LITTLE BROTHER WHO CALLS HIMSELF A. I. ROOT.

My papa has 11 stands of bees; he keeps them in the front yard. I like to help him. Mamma has one stand of bees. My little brother calls himself A. I. Root. When he gets stung it knocks out some of his self-conceit. I am going to school. I have one pet pig. ——, age 9.

Concordia, Ky.

Give my respects to my little namesake, my little friend; but, what do you call *yourself?* I am glad that your brother thinks enough of me to wish to be named after me.

A LETTER FROM A LITTLE GIRL IN ENGLAND; PHENOL FOR CURING FOUL BROOD.

I have been thinking of writing to you for a long time, and now intend doing so. I need not tell you that father keeps bees. I suppose you know he does. He can not understand how it is you do not say any thing about the new cure for foul brood. It is called phenol. He has sold a lot, and customers say it soon cures the complaint. He sent some to Mr. Robert Lees, Lucknow, Ontario, whose bees were very bad with the disease. Perhaps you can find out whether he did any good with it. Have you seen Mr. Cheshire's new book? Father says he will post it monthly for you, if you like.

JESSIE HOLLANDS, age 11.

The Apiary, Waddon, Croydon, Surrey, Eng.

Thank you, Jessie, for your kind letter and inquiries. I have touched upon the phenol remedy several times; but so many remedies have been proposed and afterward dropped during the past years that this matter has been before us, that I hope you will excuse me for being a little slow about recommending these new things. Besides, we have had some reports already, if I am not mistaken, saying that phenol did not answer, even when used exactly according to directions. We should be very glad indeed to have Mr. Robert Lees' report. We have seen Mr. Cheshire's book, and you will find a report of it on another page.

FROM 16 TO 65, AND 3000 LBS. OF COMB HONEY.

My pa had 165 colonies of bees a year ago, and they all died in the winter but 16; he now has 65 good ones and has 3000 lbs. of honey in 2-lb. sections. This year he raised his queens too, in little bits of hives he called mine. Pa has gone to Nebraska with 1200 lbs. of honey. He went in a covered wagon, with a four-horse team. Pa will be surprised to see my letter in GLEANINGS. This is my first letter. BIRDIE NEEDELS, age 7.

Alanthus, Mo., Nov. 18, 1885.

Thank you for your report, friend Birdie. Your letter teaches at least one good thing; namely, that we must never get discouraged. If we get into Blasted Hopes one year, we stand a good chance of getting out again. Your papa certainly did well to average nearly 200 lbs. of honey, besides the increase and raising his own queens. ERNEST.

MORE ABOUT RATTLESNAKE APIARY.

After my last letter I thought I would not write again, as others write more interestingly; but your postal of Oct. 26 was a surprise and joy to me. I hope you may live many years to gladden the hearts of both adults and juveniles. We had a killing frost Nov. 26th; bees were bringing in pollen up to that date. Pa has turned the bees over to me. He said he would not have time next year to bother with them. I am going to school, and will continue to go until swarming time, April 1. My bees will not need any more attention until that time.

I went with my pa to Rattlesnake Apiary one day last week, and prepared our bees for winter by contracting the entrances and taking off one of the supers, leaving them in two-story hives, the lower story full of natural stores, with some in supers. I don't like to winter in a two-story hive. On warm days the bees go into the super, looking after the treasures there. They are either unable or unwilling to return to the cluster when the weather turns cold, and are chilled to death. The first warm day after each cold spell last winter I noticed a handful of dead bees in front of all strong colonies. By looking in the hives I found they chilled between the combs in the supers. How is it to be avoided? How shall we winter in this latitude—36°? How are we to take care of so many empty combs, without the help of the bees to clean them up during warm spells? Our home apiary, which I will call Jones-Prairie Apiary, did not do much this year. It increased from 45 to 64, and we extracted 1947 lbs. They are in fine condition. The lower story has ten full frames, with more than 1000 lbs. of nice comb honey in supers. Those that have not forgotten my report from Rattlesnake Apiary probably wish to know why 20 weak colonies, spring count, produced so much more honey than 45 strong ones. The two localities are within eight miles of each other, yet the soil and growth are as different as if they were 500 miles apart. Jones Prairie is a gray sand, nearly all of it cultivated in corn and cotton. The country east of us for three miles to the Brazos River is a sandy timbered country. More than a thousand acres are cultivated in cotton in becrange of our Jones-Prairie Apiary. We have never had any honey from it. I don't think cotton as a honey-plant amounts to much.

SAM. H. TERRAL.

Jones Prairie, Tex., Dec. 1, 1885.

Friend Samuel, I do not think I would contract the entrances for winter—certainly not in your locality; and if I left combs in the upper story at all, I would fix it so the bees could not get up on to them. This, however, may not be necessary where the upper story is close, so the bees will not try to get out where they see light shining through, instead of going down through the entrance. Sometimes very strong colonies cluster partly on the lower combs and partly on the upper. In that case I should think it would do no harm. I should not think there ought to be much trouble in wintering, in any region where cotton is raised.

OUR HOMES.

Thy kingdom come. Thy will be done on earth, as it is in heaven.—MATT. 6 : 10.

DID it ever occur to you, dear friends, that the first petition in the prayer which our Savior gave us is, that God's kingdom may rule on earth as it rules in heaven? And as we have God's promise that our prayers shall be answered, it is certainly true that the time shall come when his will *will* be done on earth as it is in heaven. Well, is this to come about all at once, like the shock of an earthquake, or is it to be brought about by the progress of human intelligence, and by the Spirit of God moving in the hearts of men? Unquestionably, the latter way; and one who does not see evidences of the coming of this kingdom, even now at this present day, must be dull indeed.

I have just returned from the convention at Detroit, and the thoughts I have just been giving you were called forth by this national gathering. The matter first came up on the cars, in talking with a commercial traveler. Like too many others of his class, he was inclined to ridicule Christians and the Christian religion. I don't believe much in argument, as you know, especially in controversies in a public place; and although I replied to him quietly and carefully, I did not hesitate to let him know that I was a follower of Christ. As he left me he replied that it would be a glorious thing, without question, if Christians would only *hold out*, and not forget their profession and their religion. I had been answering him with texts; and my parting word was the admonition, that only "he that endureth to the end shall be saved." He smiled as I looked him full in the face while I gave him my answer, and apparently he opened his mouth to reply; but catching the glance of a passenger in the next seat, there was a little general laugh all around, and he evidently thought he might as well give it up. The Bible is equal to every and all emergencies; and if one follows its precepts, there is no danger of one getting around it or avoiding its conclusions. While talking, a nice-looking young man about the age of Ernest came up and asked if he had the pleasure of speaking with A. I. Root. As I smilingly nodded, I extended him my hand. He is a reader of GLEANINGS, and lives in Lancaster Co., Pa., and he is an earnest Christian. How I do love to see young men who are not afraid to acknowledge the Savior! We roomed together that night and the next. My acquaintance with him strengthened my faith in the idea embodied in our text. That glad time is coming; and, oh what a help these vigorous young hearts are going to be in bringing it along! The next morning I met a couple of bee-friends whom I fear have little or no faith in God, and, as a matter of course, not much in their fellowmen. What a sad, sad thing it is to lose faith in humanity, and to decide that the world is *all* hollow and deceitful!

When we reached the convention we found the hall filled, and the members seemed to be in the midst of an animated discussion. That I might not interrupt, I quietly slipped into a seat by the door, proposing to go forward when there was a better opportunity. Somebody near the speaker's stand, however, caught sight of me and motioned me forward. There were Bro. Jones, Bro. Newman, of the *A. B. J.*, W. F. Clarke, friend W. Z. Hutchinson, friend Heddon, and good old father Langstroth besides. Mr. L. C. Root, of New York, whom I had never seen before, occupied the president's chair, while roundabout were the friends whom we have heard from through the journals, and read about for years. Scarcely a face was missing, unless it was that of Dr. C. C. Miller. Pretty soon W. F. Clarke stood up with a large paper box in his hand; and what do you think were my feelings when he spoke something as follows?

"Mr. A. I. Root will please stand up here before me and look me in the face."

I suppose you have heard, or had experience, of the way in which people think of a great many things while they are falling from a building, or during some great danger. Well, while I was rising to my feet and obeying orders, I thought of a great many things. I inventoried, as it were, all that I had been guilty of, to see whether there was any thing there that I might fear to have brought to light. Well, although I am bad enough as it is, I could not think of any thing that should warrant calling me up in this way for a public reprimand; so I concluded (while I inwardly thanked God that no guilty secrets lurked within my soul) that friend Clarke's "medicine" certainly could not be any thing very bad to take. Now, I can not remember what his address was, only that it was in substance something like the following:

"Bro. A. I. Root, we, the bee-keepers of North America, in recognition of your services during the years that are gone by, not only in laboring for our temporal good, but in view of the energy and zeal with which you have toiled for our spiritual good as well, do hereby tender you this beautiful book. Now, dear brother, while we say this, remember, please, we do not all of us indorse all of your peculiar doctrines, neither do we think exactly as you do on many points; but for all that, we know you have worked honestly and faithfully and unselfishly; and in view of this we take pleasure in handing to you this small testimonial of our esteem and friendship. Take it; and may God spare you to work with us for many years yet to come."

As he took his seat, he indicated, in a lower tone, that I was expected to make a speech. Now I want to say, by way of parenthesis, that, a few weeks ago, I was called upon to tell my story about Mammoth Cave, in our neighboring town of Akron, Summit Co., O. It was at a large Sunday-school convention, and of course the papers advertised me pretty well, and I had a large church pretty well filled, for an audience. The next day, the papers, in reporting a part of my talk, made the remark that "Mr. Root told the truth when he said at the outset, that he was not much of a speaker."

They did say, however, that I gave them a very pleasant conversational account of the wonders of Mammoth Cave. Well, I am afraid the friends at the National Convention thought I was not much of a speaker; but I guess they gave me credit for being honest, just as the newspaper reporter did.

I wish I could tell you what was said and done during the convention during that day, but it is utterly out of the question. The reports of the papers read, you will doubtless see. But no pen can picture the pleasant, hearty good feeling that pervaded the convention; and above all, the kindness and broad charity for each other, even in our differences, that seemed to be the prevailing spirit through it all. We went there with our hobbies, a great many of us, and we got laughed at; but we were laughed at so good naturedly, that grace was given us to laugh back again. W. F. Clarke had his hibernating-box there on the stand, and friend Heddon had his pollen theory along with him. D. A. Jones had his wonderful stock of dry jokes ready to crop out when an opening gave even half a chance. Mr. J. B. Hall, of Woodstock, Ontario, kept us roaring with his grotesque oddities, and Prof. Cook rose up once in a while (in fact, I was sorry he did not rise up oftener) and give us wise counsels and wise suggestions; and Prof. Cook has such a kind, neighborly way of telling these suggestions, or even calling us back to the right track, that no one can ever for a moment think of feeling hurt at any thing he says.

Friend Muth was there too, towering above the rest of us, and making us all feel pleasant just to look on his genial face while he read an article on the sale of extracted honey. I for one was surprised to learn that they are now using honey largely for packing and curing pork; and friend Muth stated that he had filled one order for 100 barrels, to be used solely for this purpose, besides numerous smaller orders; so you see another avenue is opening for the sale of honey. Honey has the property of answering even better than any grade of molasses that can be bought at any thing near the price.

In shaking hands with the different friends at the noon intermission, I asked one great stalwart chap his name, and he just laughed at me. "Why," said he, "I am G. M. Doolittle; and although I stayed once with you three or four days, you don't know me." I felt ashamed of myself, and no doubt blushed in confusion. But when there was such a sea of pleasant faces, and so many wanted to shake hands with "Bro. Root," I got sort o' mixed up, and scarcely knew anybody. Besides, that big book had scared me and astonished me, so that it all seemed somewhat unreal. By the way, I forgot to say that the book was a large illuminated edition of Paradise Lost, illustrated by Gustave Dore. Now, I am almost ashamed to say that I don't know what Paradise Lost is about very well; but I am going to commence reading it to my wife evenings.

Mr. L. C. Root, the president in the chair, I had never before met. Before the convention was over I had abundant reason to be sorry that I had never met him; and, by the way, before the first day had passed I began to have a much higher opinion of a great many whom I met and heard from there than I ever heard before; and by some queer coincidence I began to have a smaller opinion of myself.

Neighbor Blakeslee once said it took the conceit out of him to go and visit his brother bee-keepers. Well, I shall have to admit that this convention took the conceit out of me in a great many ways. I was surprised and astonished, over and over again, at the masterly way in which one brother after another handled the subjects as they came up. Their experiences indicated that they had read and thought and practiced, and also that the deductions that they had drawn were based on much wisdom and common sense. The Bible says, "In the multitude of counselors there is safety," and I had a feeling that, with such meetings as this, the future of bee culture must be safe and sure. And then came every now and then a glimmer of the thought embodied in our text, that it is certainly a good and wise thing for men of great intellects to meet and compare notes and exchange ideas. I have before had strange convictions that these meetings were going to result in pleasanter feelings between the North and the South, and the East and the West, and between people of different nations and different ideas, and that through such meetings the glad millenium was to be hastened — the time when God's kingdom should come, and his will be done on earth as it is in heaven.

The number in attendance at the Antisdel Hotel was so great as to fill it to overflowing, and every room was alive with buzzing voices. It seemed like one great family reunion. The waiters eyed us a little curiously, and the newspaper men evidently didn't quite know what to make of us. In the *Evening News* of Dec. 9, appeared the following little item, which, although probably greatly exaggerated, I think has enough truth in it to cause our hearts to rejoice, and to indicate again that the promise in our text is surely coming. Here is the item:

"The bee-keepers seem to absorb something of the traditional virtues of the insect they cultivate. Those attending the convention now in session in this city stop at a temperance hotel, seldom indulge in the dissipation of a theatrical entertainment, retire early, and are strangers to the fascinations of the weed. The boy who keeps the cigar-stand at the Antisdel house, to a remark about trade, replied, "I've sold only one cigar to the whole bee-keeping gang, and that was a five-center."

In the morning I was up as usual at half-past five. The clerk inquired if bee-keepers always got up at that time in the morning. I told him I did for one, and asked him if he could give me the address of the largest greenhouses in the city, and whether any of them were devoted to raising vegetables. He could not answer me directly, but by the aid of the directory he gave me some points to look up. I was the first one to go into the breakfast-room. Breakfast over, I hied for the greenhouses. The air was bright and frosty, and the half-mile walk soon made me happy. I found a beautiful greenhouse, but it was all flowers. I would very

willingly have given four dollars for an azalea growing in a small pot, were it possible for me to have got it home without injury. Were there *ever* such poinsettias, japonicas, and camelias before? The proprietor was engaged in fixing a basket of exotic flowers, intertwined with smilax, while he talked with me. May be such collections of beauties have been in sight where I was around before, but I can't remember it. One greenhouse was devoted to orchids; and even these odd-looking things had a beauty that morning that I had never seen in them before. Do you want to know why every thing seemed to be speaking of God's glory, and moving me to lift my heart to him in thanksgiving and praise? Why, I had been having a *brisk walk* in the *open air*. Do you remember what I said about the Peck's Pleasant apple, and the California honey? That was it — brisk, health-giving exercise out in the wintry air. Following his directions I took a street-car, away over to the other side of the city, and on my way I stopped at the central market. Here I found celery on sale, away ahead of any thing our grounds had get produced. I looked for lettuce, and finally inquired of one of the stout German women who stood by their stands, even though the weather was down toward zero. She threw a blanket from the top of a barrel, and showed me the same kind of fringed lettuce I saw in the market in Columbus, evidently raised out of doors, protected by some sort of mulch. It seemed a little strange to me that the lettuce was kept from injury by the frost, by a simple barrel and blanket. These people at the market have learned by sad experience, just to a dot, what their vegetables will bear, and I was greatly pleased to see how they managed during such a winter morning, and also to see how they succeeded in handling choice vegetables so safely.

There was nice honey on the market, and I was pleased to see some of the finest packages labeled, "From the apiary of M. H. Hunt, Bell Branch, Wayne Co., Mich." All the honey offered for sale had the name of the producer plainly printed on the package; and from appearances I should think they were having quite a trade in the genuine article. Why can't newspaper men interview the *market men*, and — tell the truth?

I was told in the market that there was a man by the name of George Ferguson who had a greenhouse specially devoted to raising lettuce, and that he brought the finest lettuce into the city of any man in the market. Nobody knew exactly how far away he lived, but it was somewhere between one and four miles. It was just eight o'clock, and I started a little sadly to go back without having found a greenhouse devoted to market gardening. I mentally figured this way: Street-cars will carry me six miles an hour. Mr. Ferguson is probably not more than two miles away. Perhaps I can find him and get back before the covention opens at nine o'clock. Off I started. The driver said he knew on which street Mr. Ferguson lived. It was off from the line of street-cars, but he did not know how far off. Soon I was on foot again, in the suburbs of the city. I found the place, as I supposed, and for the first time in my life I saw nice large heads of lettuce in the middle of the month of December. They were whiter than ordinary lettuce—in fact, almost if not quite as white as nicely bleached celery, on account of the heavy manuring they received, probably, and the confinement of the greenhouse. A boy in his teens showed me through the houses, but I was somewhat dissatisfied at the want of order and system. Finally my young friend remarked, with a touching sadness, "We used to have things looking nicer before father died." I did not feel like criticising any more. If God should see fit to take me away, would that sad remark, or a similar one, be heard around my home? May God help the widows and the fatherless! Pretty soon he said that his uncle did a good deal more at lettuce than they did. His *uncle's* name was *George* Ferguson, the man I was after, so I hadn't found the place after all. His younger brother said it was probably about a mile, but the other said it was a little further. I walked a mile, and inquired. They said it was a mile yet. Another mile, and I found a man mulching spinach. This was just what I wanted to see. After he had shown me all about it, he said my destination was *still* about a mile. Shall I go back and give it up? Fifteen minutes more time, and I shall probably find what I seek. No doubt I shall find some hint worth to me at least *thirty* minutes' time, and so I pushed on, and I got my reward, not only in seeing the beautiful lettuce, but Mr. Ferguson's wife told me that he had more orders at $1.75 per bushel than he could possibly fill. In fact, he had gone to town now with a load hardly large enough to cut. She said, that the day before Thanksgiving he could easily have sold *forty bushels* at $2.00 a bushel; and yet a few years ago people wouldn't buy it at all in December. The demand for such stuff is of recent date. I will tell you what else I saw. Adjoining one of the greenhouses was a warm light room for poultry. Old Izaak Walton once remarked, "Doubtless God *could* have made a better berry than the strawberry, but *doubtless* he never did." I felt like saying, "Doubtless God *might* have made a handsomer flock of Light Brahmas" than my friend the old German woman exhibited to my admiring gaze; but it seemed to me "doubtful whether God ever did" make another flock as handsome. They were cackling and singing, and laying eggs, apparently oblivious of the fact that it was the middle of December and not May. But, weren't they beauties?—spotlessly clean, covered with soft down, and of immense size, with grace and symmetry in every motion, and that kind, neighborly look (if it is proper to say a hen can have a *neighborly* look) that is so characteristic of the Light Brahmas. Do you wonder why they gave me such pleasure, that keen, frosty morning? Why, I had got loose in the fields, and had been walking briskly two or three miles across lots, climbing fences, studying God's wonders, and loving his creatures.

There was one thing about their greenhouses where I think I could have made an improvement, in raising lettuce at least.

The plants were not accurately spaced, and they did not economize the ground under the glass, when that ground was so extremely valuable. Some of the plants were nearly a foot apart; others perhaps two inches; and when plants were pulled up for market, the ground was not *at once* prepared, and more plants set out, as we do it in our greenhouses. But my mission of the morning had been accomplished; I knew just how it was done, even though I had played truant a little in being "late to school." I had also seen it demonstrated that poultry can be made to do beautifully, and lay right through the winter, by a modification of the manner in which we raise plants in the winter time. Many of the poultry-journals say that artificial heat makes fowls tender, and engenders disease. I should put it this way: Artificial heat in the hands of a slipshod manager will probably engender disease and feebleness in either plants or animals. There is no success in any thing without intelligent painstaking.

The time approached for me to take the train home. I asked the president for permission to say a word or two to the friends before I left. In my brief talk I closed up with the little text at the head of this talk. I then wanted to get away as quietly as possible, that I might not disturb the interest of the meeting by going out before the regular close. But, up hopped our jolly friend Jones, and proposed a recess of five minutes so that they could all shake hands with "Bro. Root" before he went away. I persisted that it was a little too much disturbance and diversion; but his motion was carried with a good deal of merriment. Now, I had already shaken hands a good many times with almost all the bee-friends there, among them quite a number with whom unpleasantness had at some time occurred. There was one brother present who had, some time before, publicly charged me with something of which I was entirely innocent. At the time he did it I wrote to him, giving him full proof of his mistake, asking him to correct it as publicly. He had never done it. Of course, I did not feel very much like shaking hands with him while he let that unjust charge stand before the bee-keeping world. While the rest were shaking hands with me before my departure, he came up too and put out his hand. I remembered at once that he had not yet recalled his untruthful accusation, but I quickly decided that it did not matter (so far as concerns *myself*) even if he never did. I had just had proof that I had as many friends — yes, a good many more, than I deserve; and what does it matter, even if *some* people do believe me greedy and unprincipled? There are plenty of others who do not. I put out my hand as pleasantly as I ever did, and gave him a hearty "God bless you, friend Blank." Now, I did not mean by this that I wished that God would prosper him in doing wrong, but I did mean that I wished that God would prosper him in all praiseworthy undertakings. My friend, did you ever pass through a similar experience?

At night I arrived at Elyria; and as I was tired and sleepy I turned eagerly toward the first hotel in sight. After I had asked for accommodations I discovered that one-half of the hotel was a beer-saloon, and a rather hard place for a Christian at that. What should I do? Why, put up with it, and do all I could to bring about "thy kingdom come," etc. Before lying down as usual, I knelt and prayed for those I had left; and I not only prayed for the bee-keepers, and for the editors of all the bee-journals, but I prayed for the saloon-keepers as well; and before my head had touched the pillow I was astonished to find a great flood of happiness and peace pouring into my soul, and the feeling I have often mentioned before, as though invisible friends were all round about me. It was not very strange, after all. I had fought against my natural temptations, and had allowed the spirit of Christ to triumph; and suddenly there came into my mind the words of the old hymn, that I always like at such times. I began to sing the first lines, and was a little surprised to find that the words came sharp and clear to my memory, so I sang the verse all through:

Know, my soul, thy full salvation;
Rise o'er sin and fear and care;
Joy to find, in every station,
Something still to do or bear.
Think what Spirit dwells within thee;
Think what Father's smiles are thine;
Think that Jesus died to win thee:
Child of heaven, canst thou repine?

Then came delicious, health-giving sleep; and as I sank into unconsciousness it seemed to me as it never had before, perhaps, that he who has God for a friend has nothing to fear, either in life or in death.

Dear reader, these are my last words to you at the close of the year 1885. I thank you for having followed me in my humble efforts thus far; and may the blessing that only God the Father can give to his children be your portion!

EDITORIAL.

The mountains and the hills shall break forth before you into singing, and all the trees of the field shall clap their hands.—ISAIAH 55:12.

HOW DEEP SHOULD WE PUT OUR SUB-EARTH VENTILATORS?

IT depends on what we want the warm air for, I think. For a cellar for wintering bees, perhaps three or four feet is all that is necessary. If we want warm air for a cold frame to grow hardy plants, perhaps we shall need to go as deep as eight or ten feet, to get the best results; but I hardly think the temperature is higher at from 40 to 100 feet in the earth than it is down 8 or 10 feet.

SWARMING OUT IN DECEMBER.

THEY left the old hive and went as far as a quarter of a mile. It is true, the parent stock suffered some depletion, but yet there is quite a goodly number left yet. It was not bees that swarmed out, and it was not the queen, but it was the queen-*clerk* Lizzie, and Ernest went along with her, to start a new home. The happy couple are just now on their way to visit friends in the east; but they expect to be back in a few days, and take up their permanent abode within about a fourth of a mile of the paternal mansion, as before mentioned.

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South Lyon, Mich., Dec., 1885.

EDITORIAL.

BEES AND BEE-KEEPING.

WE have lately received a few advance copies of "Bees and Bee-keeping," by Frank Cheshire, England. The work is to be completed in 19 parts. As a treatise on the physiology and anatomy of the bee, it probably stands at the head. The engravings are very fine—a copy of one of which, with a few slight modifications, is seen in another column. So far as we have been able to notice, the writer seems to be not only a skilled microscopist but a careful observer. ERNEST.

AN EXPERT BEE-KEEPER IN THE EMPLOY OF THE UNITED STATES.

ONE of the many treats to which we listened at the Detroit Convention was the papers from Prof. McLain, whom we have before mentioned as employed by the Government to test disputed matters in bee culture. A very elaborate experiment was made to ascertain whether bees can puncture grapes. Not only were grapes innumerable provided, but many colonies of bees. The decision was in the negative. We are pleased to mention that friend McLain has also succeeded in fertilizing queens by mechanical means. It is true, this has been accomplished before; but the professor will probably soon be able to give directions so that any ordinary bee-keeper can manage the process with but little risk of failure. We have reason to feel thankful toward the United States for having furnished the means for such experiments; and we also rejoice that they have secured the services of so able a man. He promises to furnish articles for the different bee-journals in due season.

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